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Edition

The SAGE Handbook of
Industrial, Work and
Organization Psychology

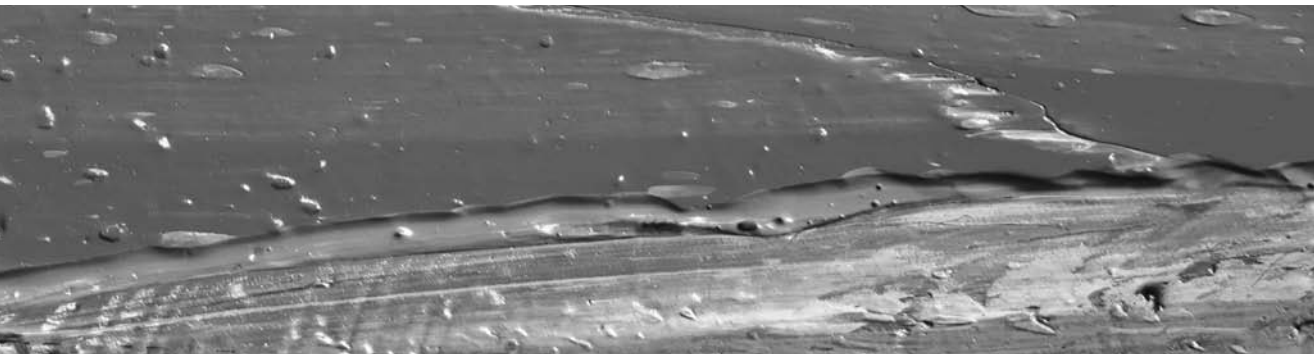


Personnel Psychology and
Employee Performance

Edited by
Deniz S. Ones, Neil Anderson,
Chockalingam Viswesvaran
and Handan Kepir Sinangil



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Industrial, Work and
Organizational Psychology

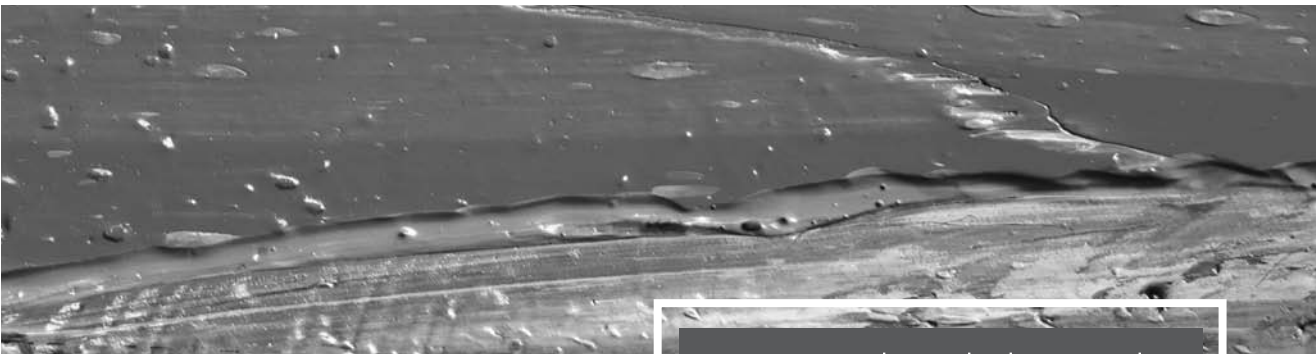


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2455 Teller Road
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Editor: Delia Alfonso
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Proofreader: Sunrise Setting
Marketing Manager: Emma Turner
Cover Design: Wendy Scott
Printed in the UK

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Library of Congress Control Number: 2017942100

British Library Cataloguing in Publication data

A catalogue record for this book is available from the British Library

ISBN 978-1-4462-0721-5

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Preface

The Global Science and Practice of IWO Psychology

From scientific management to the human relations movement, from cottage industries to craft guilds, from the industrial age to the information society, the issues that have dominated the field of industrial, work, and organizational (IWO) psychology have changed over the years. Toward the end of the second decade of the twenty-first century, IWO psychology is a global science and arena for professional practice. Our original, bestselling two-volume *Handbook of IWO Psychology* (2001) is now a three-volume set that reflects the strides in the field, both in substantive content, expanding knowledge, and evidence-based application. The changes and developments since 2001 have been so fundamental and sweeping that all the chapters in these three volumes are brand new. In preparing these volumes, we have rejected the idea of merely updating the previous version's chapters with new references and some new content. Instead, we have commissioned chapters that better reflect the current subdomains in the field and incorporate the developments of the past decade and half from the ground up. We have also sought authors with fresh and contemporary perspectives, as it is our hope that the present three-volume set will take IWO psychology to the second quarter of the twenty-first century.

Nonetheless, our overarching objectives in this second edition have remained (1) to cover recent research on work and organizational psychology by leading experts around the globe and (2) to develop psychology of work that is applicable globally. The *Personnel Psychology and Employee Performance* volume primarily focuses on individuals in organizations and covers personnel psychology issues. The *Organizational Psychology* volume primarily covers organizational psychology topics. The *Managerial Psychology and Organizational Approaches* volume highlights areas of interest in managerial psychology, with coverage of broader, strategic topics and concerns.

It was our intention, as editors of this *Handbook*, to produce a globally contributed, globally oriented, and globally relevant collection of chapters which comprehensively covered the major and vibrant topics comprising our field into the second quarter of the twenty-first century. We recognize and learn from manifest cross-cultural, socio-economic, and historical differences. But what we stated in the preface of our first edition is still true:

We were equally determined not to allow a drift downward into parochial, single nation, local issues and perspectives to dominate this *Handbook*. The very title, *The Handbook of Industrial, Work and Organizational (IWO) Psychology* reflects these aspirations on the part of the editors. Credit is due to our esteemed colleague Paul Sackett who proposed this globally-focused title as a combination of Industrial-Organizational (I-O) Psychology in the USA, and Work and Organizational (W/O) Psychology in Europe and other countries worldwide.

In the past two decades, IWO psychology has become a field of global science and professional practice. Global psychology of work thrives: IWO research is not solely conducted and published by those in North America and Europe. Knowledge is generated, replicated, and disseminated worldwide. The choice of research questions reflects both the global and regional zeitgeists and concerns. The scientific research methods utilized are universal. But, perhaps most importantly, findings of generalization and regional

specificity are rigorously tested with regularity. These developments have shifted the perceptual, analytical, and disciplinary boundaries of IWO psychology forever away from the parochial. International concerns and challenges are attended to in all sub areas of IWO psychology.

With regard to the practice of IWO psychology, alongside this diversification of scientific focus toward a global conceptualization of the discipline, changes in the practice of organizational psychology have also taken on an increasingly global shape and size. There is greater collaboration and sharing of expertise across countries in IWO psychology. Global consultancies dominate the market with their multinational presence and practice. Consequently, IWO psychology has standardized practices across national boundaries.

The chapters in these volumes are geared to consolidate IWO concepts and knowledge on topics studied by IWO psychologists, drawing upon research and practice from across the globe. Hopefully, they reflect and satisfy the demands of a global science and practice of industrial, work, and organizational psychology for many years to come.

Handan Kepir Sinangil, Istanbul

Deniz S. Ones, Minneapolis

Chockalingam Viswesvaran, Miami

Neil Anderson, London

Acknowledgments

Preparing a major, globally relevant, three-volume *Handbook of Industrial, Work and Organizational (IWO) Psychology* required much collaboration and effort from everyone involved. First and foremost, thanks are due to the co-editors of these volumes for making this second edition possible. We have great respect and admiration for each other and cannot imagine a better editorial team. Between the first edition and this much expanded second edition, we have collaborated for exactly 20 years, providing each other with intellectual challenge and social support. Each editor's contribution was somewhat different for this second edition. The chapter reviews were handled by Viswesvaran, Anderson, and Ones. Strategic decisions benefited from Anderson's leadership. Content benefited from Viswesvaran's vast expertise and keen awareness of important developments. Structure of the volumes and administrative details were handled by Ones.

For the actualization of the *Handbook* with 69 chapters across three volumes, our gratitude goes to over 100 eminent authors across over two dozen countries. They accepted our invitation with enthusiasm and devoted a considerable amount of effort to this project. Not only did they produce outstanding chapters, but they also were timely with their revisions, although the publication of the volumes was delayed due to reasons beyond their or our control.

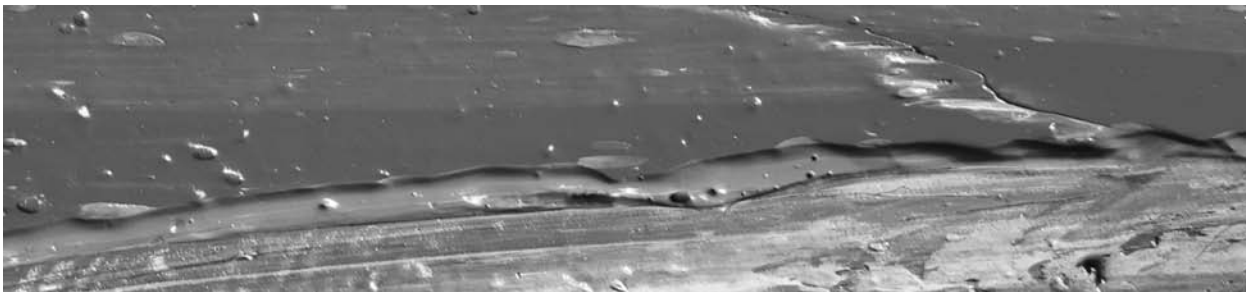
The volume of administrative work on this undertaking was much greater than the first edition. Our editorial assistant Melissa Kellen at the University of Minnesota's Psychology Department, where our Administrative Headquarters was located, was more helpful and important for this project than anyone will ever realize. Her efficiency, professionalism, and enthusiasm made our editorial work a little easier and a little less distressing. Partial financial support for the *Handbook* editorial office came from Ones' Hellervik Chair and Distinguished McKnight University Professor research funds at the University of Minnesota.

We also would like to extend our sincerest thanks to the Sage (publishing) team. During the various phases of the *Handbook*, we have had to work with many different Sage publishing editors and their teams; they all were helpful. As the volumes took shape, our colleagues and students at our respective institutions also provided valuable support. In this regard, I cannot overstate the intellectual stimulation, assistance, and care that I received from my past and current doctoral advisees. Thank you!

Those closest to us perhaps gave the most and suffered the greatest during the completion of this project. To them, we offer genuine apologies for the neglect they had to endure and for the encouragement they nonetheless provided, while we labored long hours during nights and weekends. In this, I especially would like to acknowledge the encouragement and support of my daughter Daria Haner.

We can only hope that the sacrifices made in the preparation of these three volumes will be balanced by the good that they will do for the science and practice of IWO psychology. The ultimate measure of our success will be if the research presented in these volumes can improve the productive work lives of millions around the world.

On behalf of the *Handbook* Editors,
Deniz S. Ones
Minneapolis
March 2017



Introduction

Chockalingam Viswesvaran, Deniz S. Ones,
Neil Anderson and Handan Kepir Sinangil

In this second edition of the *Handbook of Industrial, Work and Organizational (IWO) Psychology*, we have greatly expanded the focus and scope compared to the first edition. The fifteen years intervening between the first and second editions have brought to the fore several new areas of research and exploration – environmental sustainability being one example. We have attempted to capture these cutting-edge themes as well as summarize the most recent developments and contemporary literature on traditional topics in IWO psychology, such as individual differences and HR functions (e.g. selection, recruitment, training, designing reward systems). This expanded focus has necessitated the need for a three-volume handbook (as compared to the two volumes of the first edition). However, we have made every effort to retain some of the features that made the first edition well received and globally successful.

Across the chapters included in this three-volume set, there are five distinguishing features.

GLOBAL RELEVANCE AND REPRESENTATION

First, the science and practice of IWO psychology is a global enterprise. Even the organizations that are restricted to local/regional operations have to

contend with global trends. Consider a hair stylist in your local community. While their employees, clientele, etc. are local, even this organization is affected by developments in different parts of the world. Many hair stylists offer their clients the option of booking appointments online in advance. The software for this operation is designed in different parts of the world and, more importantly, consultants can collect enormous amounts of data about their clients (e.g. preferences, patterns of behavior) and enable the local hair stylist to better market their products. They can identify fashion trends across the country and detect regional and cultural patterns. One can expand these examples to every aspect of the stylist's business (e.g. mom and pop shops competing with national/international chains; globally sourced products used and sold in such businesses). Thus, the business of every organization is affected by trends beyond the local market, and competitive advantage dictates a global outlook in business operations. Each chapter in this *Handbook* attempts to capture this global impact when summarizing the research and practice in their topic.

Globalization, internationalization, and inclusion of cross-cultural issues are also seen in how we practice our science. The leading consulting companies that design and market IWO products are global in scope. Most companies have operations in the USA, UK, and Europe, but also in the

Middle East, China, India, Latin America, South Africa, and many other countries and regions. Their products and services are globally accessible. This is also reflected in how our universities prepare future researchers and practitioners. Many professors and universities have collaborations with institutions in other countries and many have cross-cultural topics in the courses they offer. Business and management in general and human resources management and IWO psychology in particular are global enterprises.

Given these trends of globalization, the chapters in these volumes were developed to ensure different cultural perspectives are reflected. For example, in considering what we know of the antecedents and consequences of employee–organization relationships (LMX, POS, psychological contracts, etc.), Shore, Cole-Shapiro, and Chang (in *Organizational Psychology* volume) explicitly integrate research from Spain, China, and other countries. The same is true of many other chapters in these volumes. As can be seen from the author affiliations, the contributors to these volumes come from over two dozen countries, yet the international perspectives reflected are global as needs of IWO psychologists worldwide have been kept in mind. In addition to soliciting authors from different cultural and regional backgrounds, we attempted to pair authors on topics such that each chapter had authors representing different experiences (e.g. well-established and recently minted scholars; individuals with differing theoretical perspectives or research traditions). We hope the dialogue between co-authors has enriched chapter content and will serve as one of the distinguishing features of this *Handbook*. Finally, further encouraging dialogue among IWO psychologists from different world regions, *Managerial Psychology* and *Organizational Approaches* volume includes chapters summarizing the research and practice of IWO psychology in specific regions of the world. This set of chapters will be a valuable resource to consulting companies as well as academic researchers.

FOCUS ON FINDINGS AND EXPLANATIONS

A second characteristic feature of the chapters in this *Handbook* is the emphasis not only on documenting the major findings but also explicating how and why human resources applications work. IWO psychology started as an applied science, but as a scientific field matures, scientists, researchers, and practitioners move from asking whether something works to how and why it works (Viswesvaran,

Ones, Schmidt, Le, & Oh, 2014). Developments in psychometric meta-analysis have enabled us to integrate voluminous data and test complex theories involving multiple variables. The chapters on the different topics in this volume summarize the scientific basis of human resources applications and provide knowledge to develop and utilize improved organizational practices. Evidence-based practice can benefit from the knowledge presented in the chapters of these volumes.

SCIENTIST–PRACTITIONER MODEL: RIGOR, RELEVANCE, AND APPLICABILITY

IWO psychology has been an applied endeavor for most of its history. The problems faced by organizations in the management of work has been the focus in IWO psychology, and most of our interventions have been based on scientific testing, experimentation, and study. Accordingly, a third feature of the chapters included in this volume is their attention to the balance between rigor and relevance (Ones, Kaiser, Chamorro-Premuzic, & Svensson, 2017). Given the *raison d'être* of IWO psychology, while testing effects with rigorous field and lab experiments are needed to sort out precise effects and causality, we also need to ensure that the resultant recommendations remain relevant to organizations and working individuals. Representing this fine balance, Levy, Cavanaugh, Frantz, Borden, and Roberts (*Organizational Psychology* volume Chapter 9) review several studies in performance appraisal research but also clearly stress the social context of performance appraisals in organizations. Theory-driven research should not deteriorate to theory as an end in itself. Campbell and Wilmot in their chapter (this *Handbook* Chapter 1) caution the field against TFTS (Theory for Theory's Sake).

The fourth major feature of the chapters included in these volumes is the usefulness and applicability of information presented for organizational applications. Developments in psychometric meta-analysis have allowed us to integrate vast quantities of literature to robustly estimate several bivariate relationships. In fact, many of the chapters in the *Handbook* review, tabulate, or draw conclusions from meta-analyses. However, we note that vast research in IWO topics exists in the archives on IWO consulting firms and in organizations where IWO psychological concepts are examined by people-analytics teams. We lament that these data are typically not included in scientific archives of our field (Ones, Viswesvaran, & Schmidt, 2017). This is a great loss. Thus, as far as possible, we have encouraged the authors of

the chapters in the *Handbook* volumes to include research and findings from non-academic sources. In discussing the latest innovations in the field, many authors have taken our request to heart and have included practitioner research or views and have noted potential problems, pitfalls, and anticipated progress in applications of their respective content areas.

METHODOLOGICAL ISSUES AND FUTURE PROSPECTS

Research methods define what we do as professionals. The final and fifth important feature of this *Handbook* is its attention to methodological issues and future directions for research and practice. In this regard, as mentioned above, chapters in the *Handbook* have tended to review, present, or summarize meta-analytic findings and conclusions. They have also pointed out methodological issues relating to their specific topic.

IWO psychology is a dynamic and evolving field, and any handbook that summarizes the state of the field has to address future research needs. Each chapter's attention to future research and application directions is an asset. This aspect of the chapters is poised to provide a roadmap for future research efforts and will be especially appealing to students.

The second edition of the *IWO Handbook* organizes chapters in three volumes. In this *Handbook* we focus on issues of selection, training, applicant reactions, and criterion issues, as well as a review of predictors in IWO practice. *Organizational Psychology* volume presents topics from organizational psychology and behavior, such as work attitudes, teams, leadership, and so forth. Finally, the *Managerial Psychology and Organizational Approaches* volume focuses on macro concerns and social issues that are becoming more salient in the management of workforces and workplaces. Each volume introduces its own coverage.

THIS VOLUME : PERSONNEL PSYCHOLOGY AND EMPLOYEE PERFORMANCE

The chapters in this *Handbook* focus on topics typically addressed in personnel psychology, or, as referred to in the European context, work psychology. The volume's two leading chapters are intended to presage a message that we feel is important for IWO psychology and, hence, all

three volumes. In the first, Campbell and Wilmot eloquently critique the (dys)functioning of theory in our field. We expect this chapter to be a classic, read by all current and future IWO psychologists. Their message is fundamental. Lowman addresses another vital area that cuts across the field: ethical issues and standards. This chapter will be a useful resource for anyone grappling with research and application ethics.

Having set the stage, this volume turns to individual behavior at work. Chapters cover different domains, or facets, of work behavior: individual job performance, typical versus maximal performance, organizational citizenship behaviors, counterproductive work behaviors, adaptive performance, and political behavior. Each of these behavioral domains constitutes a major criterion variable for determining the effectiveness of human resources interventions (e.g. selection, assessment, staffing, talent management, training, development) and also contributes to organizational performance, effectiveness, or functioning. For example, Harari and Viswesvaran (Chapter 3) discuss current issues with the measurement of the performance criterion variable, summarizing research on dimensionality, identifying various facets, and describing recent research on dynamicity. Questions of halo in ratings and leniency effects are presented.

The volume then turns to individual differences and capabilities. Cognitive ability, job knowledge, and political skills are discussed in their respective chapters, highlighting the knowledge, skills, and abilities that determine performance and behavior. Non-cognitive individual differences covered include personality, interests, and work values. A taxonomic chapter on personality and cognitive ability (Chapter 13) is intended to provide IWO researchers and practitioners with information about the organization of myriad personality and ability attributes and compendia to link specific measures to specific traits.

The next section of this volume is devoted to staffing, decision making, and training. Methods and techniques used in employee selection are discussed. Kuncel's iconoclastic chapter (Chapter 16) highlights several judgment and decision-making problems and issues that plague selection systems, potentially affecting their usefulness. Recruitment, job search, and job choice as well as applicant perspectives are discussed in their respective chapters. The penultimate chapter is a comprehensive, thoughtful, and accessible chapter on training. We share in Campbell, Kuncel, and Kostal's call for a broader view of training effectiveness. Finally, the volume concludes with a broad chapter on decision making in organizations that provides perspective for all decision making in IWO psychology. Zhang

and Highhouse present a timeline of how judgment and decision-making (JDM) literature have grown in IWO psychology, trace its lineage to other areas of psychological research, and provide directions for future research.

THE FUTURE

IWO psychology has evolved greatly over the past several decades. We have come a long way. The changing nature of work is perhaps a reflection of our history as a species. In our odyssey as a science, several exciting turns are ahead and we hope this volume captures some of the excitement in our field.

Dunnette foresaw the scientist–practitioner model over 40 years ago. Emphasizing the benefits to be gained by both wings of our discipline working in synergy, he professed a cautiously optimistic future:

I believe that success for the field ... is just around the corner. Industrial and Organizational Psychology is today an academic discipline, an emerging blend of research, theory, and practice. The blend offers great promise, in the years ahead, for further developing and extending our knowledge of those behavioral processes which are critical to an understanding of interactions between persons and the institutions and organizations of society. (Dunnette, 1976, pp. 11–12)

The ‘great promise’ of blending practice and science is yet to be fully achieved (Ones et al., 2017a), but hope survives. Our sincere hope, in fact, is that the current three-volume set provides the reader – whether a practitioner, established researcher, or student – with a timely overview of our burgeoning field of inquiry into human behavior in the workplace.

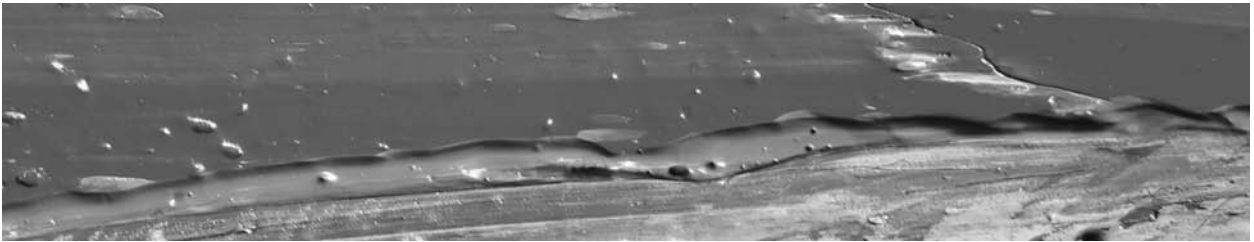
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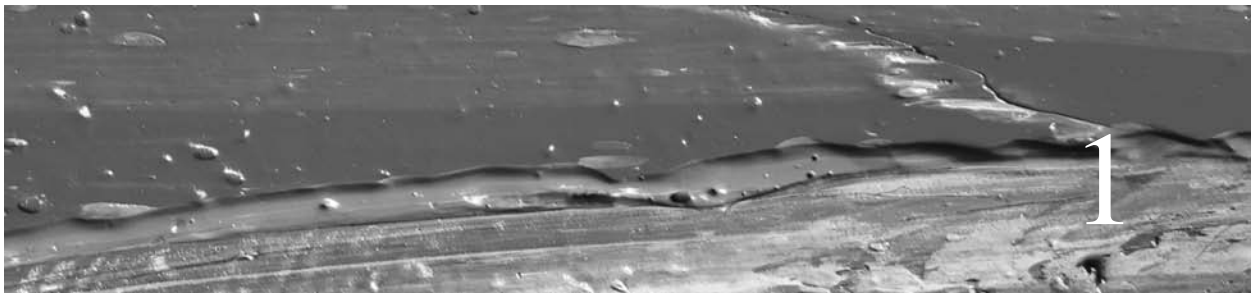
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PART I

Professional Context: Theory and Practice



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The Functioning of Theory in Industrial, Work and Organizational Psychology (IWOP)

John P. Campbell and Michael P. Wilmot

INTRODUCTION

The title was chosen advisedly. This chapter is not about how to construct or create theory. It is not about the epistemology of theory. It is not about philosophy of science in general, or about logical positivism, modernism, post-modernism, or social constructivism in particular. It is not even about good theory versus bad theory. Rather, the goals are to consider: how ‘theory’ currently functions in industrial, work, and organizational psychology (IWOP); (1) what its role(s) seem to be; (2) what its objectives are; (3) the context(s) or environment(s) in which it seeks to operate; and (4), most importantly, the utility of theory for advancing the goals of IWOP. Specifying the purview of IWOP is not a simple matter. We will take it to be theory, research, and practice (TRP) that deals with the functioning of individuals, teams, and perhaps even larger groups in a work setting. Traditional organization theory (e.g. Porter, 1980) is viewed, for the most part, as outside this domain.

First, a few disparaging remarks about a *very* sacred cow. Lewin’s statement that ‘there is nothing so practical as a good theory’ is revered in organizational science. However, it is on a par with other very general and abstract statements such as, ‘behavior is a function of ability and

motivation’ (i.e. $B=f[A \times M]$). At some (high) level of abstraction these statements are perhaps ‘true’, but the level of abstraction is so high that they are rendered essentially useless. What does ‘good’ mean? What does ‘practical’ mean? What is meant by ‘theory’? The level of abstraction issue plagues the literature on theory, as well as much of the broader literature on behavior in work roles.

Given the state of discourse in IWOP and management science, which we judge to be overly abstract, pedantic, and somewhat pretentious, the first author, when reviewing journal submissions, has always followed the practice of first attempting to translate the abstract of the paper into something that is more directly understandable, and reflective of what was actually done in the study. Such a translation seems to bring the statements of objectives, methods, findings, and conclusions into a clearer, and hopefully more accurate, focus, which makes it easier to compare the paper to other papers, evaluate its various sections, and state what its implications are. In his Academy of Management 2009 presidential address, DeNisi (2010) also complains about the use of overly abstract language, and uses the example of eventually figuring out that ‘mimetic isomorphism’ refers to one firm copying what another firm does (p. 196). The first author has also taken to

presenting sentences or paragraphs from the literature to other people (e.g. students) and then asking for (or trying to offer) a translation into a more direct and understandable language that means the same thing. Try it sometime, it's enlightening. We have tried to make this chapter as jargon free as possible, and minimize the use of overly abstract language.

OBJECTIVES

The objectives of this chapter are to:

- 1 Consider the context, or environment, within which theory development, theory use, and theory evaluation take place. The major context parameters to be considered are:
 - a The different perspectives of 'who benefits' from research, theory, and practice in this field, and how the goals of the various parties can differ.
 - b The general goals of IWOP research and theory, as articulated by the mission statements of the primary professional organizations, and their primary journals.
 - c The micro versus macro divide(s).
 - d The research versus practice issue, in terms of why it is an issue, the possible goals for resolving the issue, and the possible means for resolving the issue.
- 2 Provide a brief summary of our literature on 'theory', as theory, in terms of:
 - a Just what is theory, and what is it not.
 - b What makes a theory good, or bad.
 - c How theories should be constructed.
 - d How theories should be used.
 - e The extent of theorizing in the literature.
 - f The revolt of the anti-theorists, or at least the rejection of theory idolatry.
- 3 Argue that there is a *fundamental* flaw in theory building as it goes on in organizational science. That is, 'theory' should not be the dependent variable, no matter how much some might want it to be. It is a means to an end, not the end itself.
- 4 Present an argument that certain other things are far more important for IWOP than building theory, *for the sake of theory*, although theory certainly has an important role to play.
- 5 Summarize the critical properties of the research and theory production process, and the things

that are threatening to degrade it, already have degraded it, or perhaps will even destroy it.

- 6 Offer some personal and heartfelt suggestions for how we can avoid such a dark future.

THE CONTEXT OF THEORY DEVELOPMENT

The context for research and practice (and theorizing) in IWOP is multi-dimensional. Consider just the following.

Who Benefits?

We submit that there are five major goals to be served by theory, research, and practice (TRP) in IWOP (summarized in Table 1.1).

- 1 Improve organizational effectiveness, realizing that there are many ways to index effectiveness and that the effectiveness indicators would vary depending on the kind of organization being considered (e.g. profit-making, NGO, governmental, educational, etc.) That is, financial return to shareholders is not the only measure of effectiveness, although the general goal of 'increasing the return to stakeholders' applies to virtually any organization. A governmental organization could think of what it returns to its constituencies, and then argue about the best indicators of such returns (e.g. minimizing the tax burden for the 1 percent or providing equal educational opportunities for all). An excellent decomposition of what organizational effectiveness means is provided by Chandler (2015). His principal point is that effectiveness refers to the degree to which customers, clients, or other stakeholders actually use the external outcomes produced by the organization.
- 2 Improve the well-being of individuals in work roles, as judged from the perspective of the individual, not the organization, or the science. The usual indicators of such well-being are levels of job satisfaction, engagement (maybe), work-family conflict, stress level, promotional opportunities, and skill development. From the individual perspective, these indicators are the dependent variables. They are not independent variables that 'cause' increases in organizational effectiveness, although that may be an added benefit.

Table 1.1 Five goals for theory, research and practice (TRP) in IWOP

Valuable and necessary	1. Improve organizational effectiveness 2. Improve individual well-being in work roles 3. Contribute to the 'common good' 4. Contribute to basic research, regardless of specific goal
Destructive	5. Maximize the number of publications and citation rates for academics and academic programs

- 3 Contribute to the 'common good'. That is, beyond a specific organization's effectiveness and beyond the well-being of specific individuals, there are societal 'common goods' to be served, such as reducing conflict, improving health care, improving education, reducing poverty, improving environmental sustainability, and promoting achievement and innovation. The 2012 Academy of Management presidential address by Anne Tsui (2013) spoke eloquently about goals for the common good.
- 4 The goals of our TRP could be just to 'learn stuff' that is, or might be, important for one or more of the first three goals. Any science *or* profession should support some degree of TRP that has no specific goal other than to better understand the phenomenon of interest.
- 5 Finally, and it is painful to write this, the goal of theory and research could be to produce frequently cited articles in 'top tier' journals, such that the *number* of publications, and their attendant citation rates, are sufficient to yield tenure, salary increases, promotions, and other rewards. Such 'big data' have also become the primary indicator of the worth, or value, of an individual's contribution to the science itself. The content of the publications, and their contributions to any subset of the first four goals, are of secondary importance. As argued later, the power of this goal is degrading IWOP, perhaps to a state of irrelevance, eventually.

Each of the first four goals has, perhaps, two sub-goals. The distinction has to do with whether the intent is to establish theory and research findings that generalize across settings or whether it is to solve problems or create innovations in a particular setting (e.g. a particular organization or group of people – similar to what Lewin called 'action research'). Both sub-goals are valuable and each can have important implications for the other. It is also the case that the distinction between 'basic' and 'applied' research is blurry, and there may be continuous interactions between the two. Such interaction is both valuable and adaptive.

Goal Five may be our undoing. It has already done much damage.

The Constituencies of IWOP

Theory, research, and practice (TRP) in IWOP has a number of constituencies in the form of identification(s) with one or more professional or scientific organizations. Perhaps the principal ones are the Academy of Management (AOM), the Society for Human Resource Management (SHRM), the Society for Industrial and Organizational Psychology (SIOP), the International Association of Applied Psychology (IAAP), and the European Association of Work and Organizational Psychology (EAWOP). These associations differ in terms of their relative emphasis on the first four goals outlined above, and their consequent emphasis on theory, research, or practice.

The dominant goal for SHRM is to facilitate improvement in organizational effectiveness, by means of more effective HR practices. The membership is composed primarily of people who do HR practice. Academics are in the minority, and those who do belong tend to be there because of their consulting practices.

In contrast, AOM is made up almost exclusively, but not entirely, of academics (graduate students or faculty) from around the world who create theory, do research, and teach. The primary goal of the membership is to understand the determinants of organizational effectiveness in terms of theory and research that identifies such determinants and explains how they function to improve effectiveness. Consequently, such things as job satisfaction or employee 'voice' are viewed as independent variables that influence organizational effectiveness, and not as dependent variables that individuals could value for their own sake.

The mission statement for SIOP states that the Society exists to enhance both individual well-being at work and individual performance (that contributes to the organization's goals). The clause in parentheses is implied, but not stated explicitly. Academics are in the minority. Over half the

members are in consulting or HR management roles, and the dominant graduate school training regimen is still the ‘scientist/practitioner’ model. Consequently SIOP devotes theory, research, and teaching attention to all of the first four general goals outlined in the previous sections, although the greatest emphasis is still on the improvement of individual, unit, and organizational effectiveness. (Yes, we are ‘servants of power’ – to a considerable degree, but then so are many other professions. It is not necessarily a sin.) SIOP is also represented as Division 14 of the American Psychological Association which adopts a very broad mission to advance the creation and application of knowledge to benefit society and improve people’s lives.

IAAP is a very broad (although not large) association that includes many kinds of applied psychologists, not just those who are concerned with behavior in work settings, although it does have a division devoted to organizational psychology. Its stated mission is to promote the science and practice of applied psychology worldwide and is not intended to be US- or Euro-centric. It makes no explicit choices among the first four goals.

EAWOP has a narrower focus than IAAP in that it supports the scientific study of behavior in work settings for purposes of promoting individual welfare and organizational effectiveness. Its focus is also intended to be worldwide and it rejects the notion that it is Euro-centric. Also, the emphasis is not exclusively on applied work and the membership is more academic than for SIOP or IAAP.

In sum, the espoused goals of the constituent organizations do vary somewhat, although the goal of understanding and improving organizational effectiveness dominates.

The Associated Journals

Within the IWOP sphere, individuals doing work on theory building, empirical research, or development of applications have a wide array of outlets for publishing their work. We certainly do not want to recite them here. Some are associated directly with the above named associations, and some are not. Some publish almost exclusively within the sphere of IWOP (e.g. *Journal of Applied Psychology* (JAP), *European Journal of Work and Organizational Psychology* (EJWOP), *Journal of Occupational and Organizational Psychology*, *Organizational Psychology Review* (OPR), *Personnel Psychology* (PPsy)); some are very closely related (e.g. *Academy of Management Journal*, *Journal of the International Association of Applied Psychology*, *Organizational Behavior and Human Decision Processes*); and some are

much broader in content (e.g. *Psychological Bulletin*, *Psychological Perspectives*), but do frequently publish important IWOP-related work. There may be 15–25 hard-core IWOP outlets and 200–250 in total (Bell, 2014).

Why mention all this? Primarily because the hard-core journals do vary in terms of the degree to which they want to publish theory, as theory. The journals that most highly value theory development, and theory-based empirical hypothesis testing, are those associated with schools of management and the Academy of Management (e.g. *Academy of Management Journal* (AMJ), *Academy of Management Review* (AMR), *Administrative Science Quarterly* (ASQ), *Journal of Management*). The *Academy of Management Review* (AMR) publishes nothing but theory. Each manuscript published in AMR must advance theory, or the theory development process, in ways that are ‘novel, insightful, carefully crafted, and challenge the conventional wisdom concerning all aspects of organizations and their roles in society’. Manuscripts that simply review the literature in a particular area, or on a particular question or issue, are not reviewed. Empirical studies ‘testing’ theory are also not reviewed. The outlet for such studies is the AMJ, which does require that all submitted papers test, extend, or build theory, and thereby ‘contribute to management practice’. Colquitt and Zapata-Phelan (2007) document the 50-year upward trend in theory building and theory testing in the AMJ.

The requirement that submitted manuscripts build, extend, or test theory is not nearly as great in IWOP, or in psychology in general. That is, management science values theory for theory’s sake to a much greater extent than does psychological science.

For some psychology journals, this situation may be changing, or has already changed. For example, in 2009 the editor of *EJWOP* expressed a desire to publish more ‘theoretical papers that propose new concepts and theories, or extend previous ones’ (González-Romá, 2009, p. 1). The editor reports that in 2008 he desk rejected 29 percent of manuscript submissions, and the most frequent reason was that the questions being investigated lacked theoretical justification. The rationale was that without such justification our understanding of behavior in work settings is seriously reduced (p. 3). That is, *EJWOP* should be more like the AMJ. Additionally in 2011, EAWOP began publishing the *Organizational Psychology Review* (OPR), which is devoted exclusively to theory and conceptual articles.

Cucina and Moriarty (2015) present a fascinating account of the growth of theory advocacy and theory terminology in selected journals in psychology. Their primary focus was on the *Journal*

of *Applied Psychology* (JAP) and *Personnel Psychology* (PPsy). For both journals they first reviewed the masthead information, as well as all editor comments and editorials from the very beginning of the journal to the present. The information of interest was the frequency with which theory was mentioned, if at all, with regard to: (a) the lack of theory not being a disqualifier for a manuscript being accepted, (b) being a desirable but not required feature for empirical papers, or (c) virtually requiring empirical research to have a theoretical justification for the research questions. They also did a computerized analysis of article texts by counting the number of times the string theor* (e.g. theory, theoretical, theorizing) was used. Masthead and editorial comments were not part of the theor* count.

The conclusions from the two data sources were virtually the same. Neither the JAP or PPSy gave much emphasis to 'theory' until the late 1980s, when it began to increase, and the increase has been dramatic since the early 2000s. For the last seven years, empirical papers in each journal are *required* to make a theoretical contribution. Consequently, both the JAP and PPSy have moved in the direction of the AMJ. The current frequencies of theor* for all three are now about the same, between 80 and 100 percent, and their masthead specifications have become very similar. Some possible reasons for this convergence will be discussed below, and in later sections. Some among us might think of high theor* rates and requirements that empirical papers be theory-based as a good thing, while others might not. More about this issue later also.

Finally, Cucina and Moriarty (2015) did the theor* counts for three basic science journals: *Nature*, *Proceedings of the National Academy of Sciences*, and *Science*. In these journals, the frequencies of papers per year containing at least one theor* were much lower, and consistently lower. Currently, the counts are between 20 and 40 percent, which is considerably less than half the theor* frequencies for the AMJ, JAP, and PPSy. Is there anything wrong with this picture? We argue later that emphasizing the publication of new and novel theory, for theory's sake, is not a desirable goal. The spread of this goal (virus?) from the AMR and AMJ to the JAP and PPSy is counterproductive, and should be treated, beginning with significant changes in editorial policies, as discussed later.

The Micro–Macro Divide

The so-called micro–macro divide refers in general to different (organizational) levels of data

collection and analysis when investigating (or theorizing about) the relationships among different variables. Not bridging the divide is potentially harmful because relationships found at one level may not be similar, or may even be contradictory, to relationships found at another level (Molloy, Ployhart, & Wright, 2011). There are many 'divides', such as between individuals and groups; groups and the larger organization; organizations and the larger industry, labor market, or society designations; or any combination of these. The argument is that findings at any given level cannot be understood in isolation from other levels because it is only one part of a system in which the parts interact (e.g. Goodman, 2000). Several papers in a *Journal of Management* special issue discuss a number of examples (Aguinis, Boyd, Pierce, & Short, 2011).

Molloy et al. (2011) also note that the academic discipline of the researchers is correlated with the targeted level. For example, psychology focuses on individuals and groups, economics focuses on the firm and industry, and sociology focuses on societal characteristics. Each of these disciplines brings along its own research questions, methods, and theory. They should not be confused. To take a simple example, the correlation between two sets of scores across individuals (psychology) should not be confused with the correlation between two sets of mean scores across units (economics?). They are not isomorphic. That is, we should not commit the ecological validity fallacy. Inferences should be referenced to the appropriate unit of analysis.

How to bridge these divides? Molloy et al. (2011) provide a number of suggestions, but one is particularly noteworthy, and it is first on their list. Citing Bartunek (2007), Lawler (1999), and Mohrman, Gibson, and Mohrman (2001), they argue that if researchers start with real-world phenomena and the basic or applied empirical questions of greatest interest, the questions themselves will require boundary spanning theory and methods. That is, the real-world questions should come first, and theory and methods must follow. It is not the case that existing theory dictates empirical questions and subsequent research methods that can span the various divides. The micro–macro divide is something of a false issue.

Research and Theory Versus Practice

There is also a relatively large literature lamenting that very little research in IWOP or management science is ever used by practitioners (e.g. Burke, Drasgow, & Edwards, 2004; Rousseau, 2012a;

Rynes, Bartunek, & Daft, 2001; Rynes, Colbert, & Brown, 2002). The issue is sometimes described as the research–practice gap, rigor versus relevance, or evidence-based versus non-evidence-based management.

This is a very complex issue, and not nearly so simple as the research versus practice mantra would imply. For example, an exhaustive review of problems, issues, and possible solutions pertaining to (a) increasing the relevance of our research for potential applications, and (b) promoting the actual application of relevant research to practice is provided by Kieser, Nicolai, & Seidl (2015). Consider just the following.

- What does the term practitioner mean? Who are the ‘practitioners’? Given that our concern is with human resource management (HRM) practices and procedures (e.g. not engineering or medicine), a practitioner could be anyone in an organization with any responsibilities for leadership or management (including individual members of high performance teams), from the bottom to the top of an organization. It could refer to HR staff members of various kinds, at different organizational levels, including PhD-trained IO psychologists in high-level staff positions (e.g. Avedon & Grabow, 2010). It could refer to HRM consultants from ‘consulting firms’ of various kinds. It could refer to PhD-trained IO psychologists in contract research firms who conduct research and development for specific clients (e.g. Knapp, 2010). It could refer to university faculty who do HRM consulting. Consequently, not all practitioners are alike and they could use, or not use, research in various ways. This is as it should be. Such variance promotes adaptive power.
- Consequently, what does it mean to affect practice? Does it mean that the internal HR staff or external HRM consultants ‘know’ specific well-established research results that could *potentially* be used to improve HRM (Rynes et al., 2002)? Does it mean that internal HR staff, or external HRM consultants do research on applied problems that is *potentially* directly applicable to practice, for example, as reported in a special issue of *Human Resource Management* (Burke et al., 2004)? Does it mean that the HR staff, or external HRM consultants, actually use established research findings to modify or change HR or general management/leadership practices (e.g. develop leadership training experiences)? Does it mean that HR staff or HRM external consultants collect data and develop procedures within a

specific organization to address specific problems or goals within that organization? Or does it mean that individual managers (or any individuals for that matter) use established research findings in real time when attempting to fulfill the performance requirements of their own work role (e.g. gives feedback in the optimal research-based way). Again, all of these characterizations of what ‘practice’ or ‘application’ means are legitimate. All are desirable and all should be enabled and rewarded, which assumes that Goals One, Two, Three, and Four are all legitimate for research *and* practice in the IWOP enterprise.

Another complication is that there are many reasons why IWOP or management science research findings may not influence the various forms of practice, by the various kinds of practitioners. For example, consider those discussed by Shapiro, Kirkman, and Courtney (2007), Rynes et al. (2002), Giluk and Rynes-Weller (2012), and Rousseau (2012a). That is:

- In fact, much research production is not directly relevant for HRM practice, either by design, or by mistake. We previously discussed five general goals for IWOP research. Four are legitimate, but only the first two, and perhaps the third directly demand application to HRM practices. Keep in mind that it is perfectly ok for research to be more basic, and have no direct intended use. It might have some day (Hulin, 2014; Latham, 2007). Research that is *intended* to be relevant for practice, but turns out not to be, is the problem, and the problem seems to be large.
- Assuming that research is directly relevant for practice, it still may not be put to use if it cannot be translated into a form that one or more of the various kinds of practitioners can use. That is, there is a difference between relevance and usefulness (Kieser & Leiner, 2009; Markides, 2011). Shapiro et al. (2007), and Cascio (2008) outline some of the reasons for failure to translate. The translation process is made more complicated by the fact that practitioners (and all of us for that matter) can give different idiosyncratic interpretations of evidence-based recommendations. Context matters. Such differences must be investigated.
- Given that relevant research findings have been skillfully translated, the information must still be transferred to the practitioners by effective means of communication. For example,

practitioners, of whatever kind, tend not to read the research literature. Kieser et al. (2015) discuss many ways in which practitioners and researchers simply do not speak the same language. They have different goals, different motives, and different ways of characterizing problems and issues.

- Even if the research is relevant, and it is translated skillfully for practitioner use, and it is communicated in a meaningful way to the appropriate practitioners, it still may not influence practice if the practitioner resists, for various reasons. A number of such reasons are discussed by Giluk and Rynes-Weller (2012), Rousseau (2012b, c), and Rynes et al. (2002). They can range all the way from practitioner distrust of researchers and research methods to a belief that success depends on experience, not research-based learning. The base rate for the latter belief may be quite high. Also, Hodgkinson, Herriot, and Anderson (2001), and Briner and Walshe (2013) point out that the in-house practitioner incentive system generally does not reward implementation of evidence-based practice.

Given the formidable problems outlined above, the literature has also produced many discussions of how to overcome them and facilitate the use of research evidence by practitioners. Simply including an ‘implications for practice’ section in a published article won’t do it (Bartunek and Rynes, 2010). For suggested strategies, see Kieser et al. (2015), Shapiro et al. (2007), the entire *Handbook of Evidence-Based Management* (Rousseau, 2012a); and also Polzer, Gulati, Khurana, and Tushman (2009) who make the interesting suggestion that some percentage of PhD candidates in IWOP-related graduate programs should have significant, real-world, and fairly high-level, work experience. In addition Latham (2009) has discussed some IWOP success stories, at some length. Also, in 2009 the Center for Effective Organizations (CEO) at the University of Southern California sponsored a workshop on ‘dual purpose’ research. It produced an edited book (Mohrman & Lawler, 2011) with 22 chapters that discussed a wide range of real-world applications of research. One commonality was the intense cooperative involvement of external researchers and consultants with internal personnel. Anderson (2007) and Cohen (2007) offer a combined total of 23 strategies for increasing the bi-directional influence of research on practice and practice on research, keeping in mind that both are multifaceted enterprises, as noted above. Beyer and Trice (1982) had previously noted 12 strategies.

A summary of the suggested strategies is given in Table 1.2.

Van de Ven and Johnson (2006) also point out that useful knowledge can come from both the many kinds of researchers and the many kinds of practitioners. Experience *is* a source of useful information and should not be dismissed. They advocate a very intense kind of interaction among all the relevant parties to develop sound research-based practices.

Along these lines, and in contrast to other IWOP professional societies such as SHRM or AOM, SIOP expressly advocates a scientist–practitioner PhD training model, and hosts a yearly conference that encourages the participation of academics, applied researchers in independent research firms, professionals from practice-oriented consulting firms, and HR practitioners who have graduate training in IO Psychology. While some may argue that academics and non-academics may still speak a somewhat different language, much of the SIOP program deals with research in use. Consequently, the membership includes many individuals who deal with all aspects of the research to application continuum. SIOP also continually seeks to evaluate and modify graduate training for the dual purposes of improving both researcher and practitioner competence (e.g. see Byrne, Hayes, McPhail, Hakel, Cortina, & McHenry, 2014). Perhaps SIOP is an example to be emulated. However, while basically sympathetic, Ployhart (2014) points out some of the nuances that the scientist/practitioner model must face. For example, the research questions on the science side must be ‘kept simple’, must deal with important real-world phenomena, and must specify research questions that are tractable. Theory must be in service to better understanding critical questions, and not an end in itself. To the extent that the scientist side drifts away from these principles, the scientist–practitioner model will suffer.

Morrell and Learmonth (2015) and Morrell, Learmonth, and Heracleous (2015) offer a contrarian view and argue that ‘evidence-based management (EBMgt)’ and by implication, any translation and transfer of research findings to practice, is not possible, or even desired. Although some of their discourse is a bit difficult to process, the reasons they give are something as follows. Research in IWOP and related fields is too ‘positivistic’ and therefore too laden with the wrong values, too concerned with findings that can be broadly generalized, which may not be possible, and too infused with management values (i.e. Goal 1) rather than the values of individuals who actually do the work (i.e. Goal 2). Further, current evidence has been produced by methods which are too narrow in scope and do not take account of all the

Table 1.2 A synthesized summary of strategies to address the researcher–practitioner divide*Researcher and practitioner publication/communication practices*

1. Include practitioners on research journal editorial boards and academics on management publication editorial boards.
2. Devote special sections in research journals to applied research that prescribes solutions to important real-world problems.
3. Use scientific/professional society media to translate and communicate relevant research to practitioners. Researchers must self-advocate for how their work can be applied.
4. Invite researchers and practitioners to speak at each other's national and regional conferences and meetings. Incorporate both research and utilization practices in each other's programs.
5. Jointly sponsor and implement journals devoted to utilization.

Education and training-related strategies

6. Incorporate more content on research utilization in undergraduate and MA/MBA programs.
7. Academics should take sabbaticals in organizations and practitioners should take part in college and university training programs.
8. University curricula should incorporate practicum projects for undergraduates and graduate students.
9. Universities should implement and fund research groups composed of both academics and practitioners.

Joint participation on national or regional boards and commissions

10. Joint participation on boards of directors for both private and public organizations.
11. Joint participation on governmental commissions.
12. Joint participation on national research councils for reviewing research findings or current organizational practices.
13. Formation of joint national research consortia to address specific problems.

Organizational development (OD)-oriented strategies

14. Realize that researchers and practitioners use different languages, operate under different incentive systems, and characterize problems and issues differently. Address these issues using team and consensus building strategies.
15. Use focus groups to explore issues of common concern.
16. Adopt the orientation that the research utilization process involves many stakeholders, is a continuous process of interactions among all the parties, and must respect the values, goals, and methods of all stakeholders, including the researchers and the line managers.
17. Utilization of IWOP-related research should not rely on the medical model because large randomized trials are seldom possible and the features of the organizational research setting are much more dynamic and reactive to interventions.
18. Build the largest possible network of research users.
19. Help HR managers make the case for utilization to line managers.

contextual variations that can negate the possibility of generalizing research results from one setting to another. They specifically complain about not using ethnographic methods (e.g. case studies and participant observations of what is happening) which can give a much richer account of how research-based practice would affect the behavior and attitudes of the people being practiced upon. But such methods *are* used (e.g. training needs analysis). In general, they come dangerously close to saying that affecting practice via research-based interventions is not possible. Their arguments border on the nihilistic. Counter arguments have been presented by Latham (2009) and by Rousseau (2006), in response to Learmonth (2006).

A more troubling influence is the increasing dominance of Goal 5 for researchers in academic

research positions. The overwhelming dominance of Goal 5 rewards research that is quick, predictable, 'theory'-based, and yields positive results (e.g. see Anderson, Herriot, & Hodgkinson, 2001; Hodgkinson, 2006; Symon, 2006). It does not reward application, or research that is directed at application; or, for that matter, research on the implementation process itself (Kieser et al., 2015). Pearce and Huang (2012) also argue that rewarding theory development devalues research relevance. They coded all articles published in the *AMJ* and *ASQ* (1960–2010) in terms of whether the material presented was 'actionable'. The frequency of actionable research plummeted during that period. As noted previously, an emphasis on 'theory' has increased dramatically over this same period. As one consequence, Silzer and Parson

(2012) note that ‘practitioners’ have virtually disappeared as editors, reviewers, or authors in our major journals.

What are the implications of all this for theory development, theory use, and theory evaluation? One is that if a theory is intended to influence practice, then it should certainly take the above considerations into account and recognize the many complexities of attempting to influence HRM practices. Theories should not hinder the application of evidence. Theory should aid application, or else get out of the way. Sandberg and Tsoukas (2011) purport to address this issue by contrasting theorizing through scientific rationality (bad) and theorizing through practical rationality (good). Unfortunately, the language is so abstract, esoteric, and sometimes confused (e.g. they confuse ‘practice’ with individual performance itself) that such theorizing seems not useful. In general, given the way ‘theory’ currently functions in IWOP, and related fields, we will argue that it hinders application. We aren’t the only ones who believe this (e.g. Briner & Rousseau, 2011).

THEORY: (THE DARK SIDE)

There is a huge literature on what theory is, what it is not, and what it should be. We make no pretense of reviewing this literature, or even distilling its essence. Others have done that. For example, there have been four special forums published by the *AMR* in 1989, 1992, 1999, and 2011 (Van de Ven, 1989; Smircich, Calas, & Gareth, 1992; Elsbach, Sutton, & Whetten, 1999; Suddaby, Hardy, & Huy, 2011). A total of 33 papers were included in these four forums, some with very esoteric titles such as: ‘New knowledge products as bricolage: Metaphors and tariffs in organization theory’; ‘Theorizing as the thickness of thin abstraction’; and, ‘Toward a theory of paradox: A dynamic equilibrium model of organizing’. This esoteric quality of the papers appeared to increase from 1989 to 2011, as contributors seemed to struggle with new and different things to say.

The *ASQ* also published a theory forum/special section in 1995 (DiMaggio, 1995; Sutton & Staw, 1995; Weick, 1995), as did the *JAP* in 2004 (Klein & Zedeck, 2004). There is also much commentary about theory from editors and presidents of professional societies. A major edited volume on new directions in theory was published recently (Miles, 2014) and of course the *AMR*, published four times per year, is devoted exclusively to publishing theory that is novel, new, or extends existing theory in new or novel ways. We will not discuss

whether there are ‘theorists’, and by implication ‘non-theorists’, in terms of their professional/occupational identity. However, that certainly seems to be a strong implication in much of the literature. Being a ‘theorist’ seems to be an academic specialty. There is also something we will call the anti-theory movement. More about this group later.

What Theory Is

Most ‘scholars’ (i.e. people who have articles published in the IWOP and management science journals) seem to agree that the basic essence of a theory is comprised of at least the following four ingredients:

- 6 A theory provides a name and the clearest specification possible for the phenomena (aka variables, constructs, experimental manipulations) of interest.
- 7 A theory makes assertions about how the phenomena of interest are interrelated, including, perhaps, how a particular intervention (i.e. treatment) should affect specific dependent variables.
- 8 A theory specifies, to some degree, the important conditions (i.e. contexts, situations, etc.) under which specific relationships should be observed, and the important conditions under which they should not (if there are any).
- 9 A theory provides an explanation for why the interrelationships should be observed and perhaps also why they should be observed under some conditions, but not others.

At this point, if the above four ingredients constitute a theory, we think that virtually everyone in the IWOP domain would agree that developing theory is the essence of what we do, even if we don’t label it as such. We are all theorists, even if we don’t self-identify as a theorist, and never use the term. These four kinds of information are the basis for making contributions to the first four goals described in a previous section. That is, without such information we cannot make contributions to research and practice that serves the organization’s goals, to research and practice that serves the individual’s goals, to research and practice that serves the common good, and to research that facilitates the basic scientific understanding of individual and team behavior in work and organizational settings.

The plot thickens, and difficulties arise, when we consider the numerous elaborations of, and

additions to, the above four elements of a theory. Consider just this partial list:

- A theory must deal with the dynamics, over time, of both the phenomena themselves and their interrelationships.
- Theory must deal with 'processes', as well as with the nature of the variables and their interrelationships.
- Theories must be multi-level and deal with the 'system' properties of why the specified variables are interrelated, in the way the theory says they are.
- Relatedly, theories should combine insights from multiple domains (e.g. economics, psychology, sociology) because a single domain cannot account for all the critical aspects of the system context.
- Theories should yield competitive tests between competing explanations.
- Theory must identify and acknowledge the implicit assumptions incorporated in the theorist's specifications for the theory's elements.
- A statement of a theory should include an inventory of the formal propositions that it can produce.
- A theory should yield a full set of relevant hypotheses that are, potentially at least, empirically testable.
- The prior probability of the hypotheses being true should not approach 1.0. That is, any given hypothesis should be potentially falsifiable (Popper, 1959).
- The actual development of a theory should follow a certain rule set. Unfortunately different theory gurus propose different rule sets.

These additional requirements complicate things for theory builders, and experienced theory builders can disagree about the efficacy of each element (e.g. do we really need 'propositions'?). Consequently, the specifications for what a theory is, is not a settled issue. The message here is that it never will be; and furthermore, it's nothing to lose sleep over. There are more important things to worry about than theory building for theory building's sake.

What Theory Is Not

There is also a classic, but smaller, literature on what theory is not; and the classic among classics is Sutton and Staw (1995). They list five things

that theory is not. The first four: (1) references that mention theories; (2) empirical data; (3) lists of constructs; and (4) hypotheses or predictions, are not theories because, while they may identify the constructs of interest or portray recurring empirical relationships, no explanations for the relationships are provided. In their view, statements that lack proposed explanations are not theory. The fifth thing is the obligatory box and arrow diagram, which, in almost all cases, conveys very little information of any kind. If box and arrow diagrams were banned forever, IWOP and management science would be the better for it (our words, not theirs). Weick (1995), in a nice way, softens the five 'nots' and argues that they are all weak approximations to theory and might later become relatively strong theory. Consequently the five things should not be banned prematurely from the theory literature.

Other commentary on what theory is and is not, focuses on distinctions between theory and other representations, such as models, typologies, frameworks, classifications, etc. For example, Bacharach (1989) argues that data, typologies, and metaphor are not theories because they start and stop with description. There is no explanation. Counter arguments for the usefulness of these other representations are given by Cornelissen (2005), Shapira (2011), and Doty and Glick (1994). The central theme of the counter arguments is similar to Weick's. That is, while the other representations may not incorporate full specifications for constructs or full explanations for why the critical relationships should exist, they all constitute potentially valuable steps on the way to a complete theory. Consequently, if judged valuable within this context, they deserve publication.

A somewhat different construal of what theory is not comes from the anti-positivist post-modernists (e.g. Astley, 1985), who argue that definitions of constructs, inferences about the construct validity of measures, descriptions of relationships, specification of hypotheses, and statements of the implications of results are all social constructions that may differ across contexts, researchers, sub-fields, cultures, or paradigms (i.e. they are language constructions by individuals in a particular social/occupational environment). Such constructions are in large part a function of the individual theorist's informal idiosyncratic theories and models that dictate how observations are framed and interpreted, and of which they may not be aware. For example, if we prescribe what job performance 'means' for raters, what 'model' of performance do the raters actually use when making ratings? Our general response is, 'so what else is new?'. Of course they are social constructions. We are not robots. Of course this presents problems of

inference and generalizability. These are not revelations, and all sciences try to deal with them as best they can. Are the oceans warming? Is smoking harmful to health? Does the Higgs boson exist? Researchers make the best arguments they can and the agreements/disagreements are by consensus of the most knowledgeable people, recognizing that there are no *absolutely* unbiased experts. Behling (1980) presents a much more sophisticated argument than we just did for why the post-modernist arguments lack force, but his reasoning is essentially the same.

In sum, the discussion of what theory is, and is not, presents no clear distinctions, and many representations are valuable. Do we actually need a singular notion of what theory is? We think not, but let's continue.

Theory Construction

In addition to the literature on what theory is, or is not, there is also a large prescriptive literature on how to build, develop, or construct theory. The prescriptions vary from the very structured to the very unstructured, but all specific theory construction efforts are located within a particular philosophical paradigm, which is not the same across 'theorists' (e.g. structuralist, post-modernist). That is, the cross classification of degree of structure by philosophical paradigm yields much variety in 'how to do it'.

Within the classical positivist/modernist/structuralist paradigm, Dubin's (1969) prescriptions for how to construct theory are the most frequently cited. To paraphrase just a bit, theory construction from this perspective involves the following steps, as summarized by Holton and Lowe (2007).

- 1 Conduct an initial literature review on a topic to identify potential constructs of interest and how they might be interrelated.
- 2 Guided by the initial review, conduct an expanded review of the literature to more thoroughly determine how constructs are currently specified and measured, the specific research questions that have been asked, and the results that have been found.
- 3 Develop an initial theory that specifies the constructs of interest, their critical interrelationships, the conditions (i.e. context) under which the relationships would hold, and causal explanations for the interrelationships. At this point the initial theory should *go beyond* current specifications and explanations and introduce something new and/or novel.
- 4 State the propositions that are consistent with the initial theory.
- 5 Use the expertise of other scholars to evaluate the theory in terms of Patterson's (1986) criteria for theory quality (i.e. importance; preciseness and clarity; parsimony and simplicity; comprehensiveness; operationality; empirical validity or verifiability; fruitfulness for generalizing research; and the degree to which it will influence practice). Other evaluation schema have been offered by Bacharach (1989).
- 6 Synthesize the expert feedback and modify the initial theory accordingly.
- 7 Develop hypotheses and subject them to empirical test.

Again, the above prescriptions are from the traditional structuralist point of view. Other perspectives would have different prescriptions (e.g. see Gioia & Pitre, 1990). Also, the above prescriptions, or some subset of them, are often restated in other terms. For example, Corley and Gioia (2011) argue that theories should be evaluated in terms of their *originality*, which can range from the incremental to the revelatory, and their *utility*, for research or practice.

In addition to the traditional prescriptions noted above, there are a host of additional specific prescriptions that fill the literature. A sample is as follows:

- LePine and Wilcox-King (2010) offer suggestions for how novel insights can be generated from reviews of existing theory and research, such as by 'challenging' existing theory.
- Whetten, Felin, and King (2009) discuss how theory from other disciplines can be appropriately 'borrowed'.
- Oswick, Fleming, and Hanlon (2011) go beyond simple borrowing and advocate conceptual 'blending' of constructs and explanatory processes from multiple sources.
- Lewis and Grimes (1999) suggest something similar, but call it 'metatriangulation', which involves synthesizing theory building approaches from different theoretical paradigms (e.g. structuralist and post-modernist).
- Poole and Van de Ven (1989) describe ways to exploit the 'paradoxes' (i.e. competing explanations) among existing theories.
- Shepherd and Sutcliffe (2011) attempt to combine the best elements of deductive, inductive, and subductive approaches into a 'hybrid' method of theorizing.

- Upton and Egan (2010) suggest ways theory building can become more multi-level.
- Cornelissen and Durand (2014) describe how using different kinds of 'reasoning' can aid theory construction.
- Pollock and Bono (2013) argue that a theory should tell a good story. They recommend 12 source books that have suggestions for how to tell a good story.
- From the post-modernist side of the house, Alvesson and Sandberg (2011) suggest generating theory and research questions by 'challenging' the values and implicit assumptions underlying existing theory.
- Current theorizing is too constrained by the formalism of 'propositions' and by modeling the relationships among the critical variables in correlational and linear terms (Delbridge & Fiss, 2013). Their advice is to forget such constraints.
- Van Maanen (1995) essentially rejects any sort of formalism or prescribed structure for how to construct theory. His prescriptions are simply [sic] to be different, creative, and to use one's imagination. Forget any rules.

In addition to prescriptions (varied though they are) for how to construct theory, there is also a literature for how to write theory for publication. For example: Whetten (1989) outlined the parts that a theory article should contain. Kilduff (2007) described 10 reasons why a theory paper submitted to the *AMR* might be 'desk rejected'. Number 10 was that the submission was just an essay, although perhaps an eloquent one, with no implications for theory. Fulmer (2012) describes how to compose titles, abstracts, propositions, tables and figures, and how to organize the various sections of the paper. Finally, Mayer and Sparrowe (2013) describe how to integrate theory into empirical articles.

Theory for Theory's Sake (TFTS)

In spite of the profuse argument in organizational psychology and organizational behavior (OPOB) and management science about what theory is and what theory is not; and in spite of the great variability in prescriptions for how to construct theory in the organizational sciences, the overwhelming, dominant goal in the management-related behavioral sciences is to keep producing new theory. Creating new theory is the dependent variable of greatest importance. The goal is to produce theory for theory's sake (TFTS). Once a new theory is

created, the goal has been accomplished. Theory is not a means to an end, it is *the* end, and the more that theories are new, novel, and interesting (in someone's estimation), the better. Empirical research that is not for the purpose of developing a new theory is simply dust-bowl empiricism, which has little or no value (Suddaby, 2014). For the record, we think this is exactly backwards. A pioneer in IWOP said as much a long time ago (Ghiselli, 1974).

A (Loud) Minority View

While the dominant view in the management-oriented journals, and perhaps now also in the *JAP*, *PPsy*, *Organizational Behavior and Human Decision Processes*, and the *EJWOP*, among others, is that the most important goal is to produce new, novel, and more interesting theory, there is a minority opinion (which includes the current authors). The most frequently cited voice is Hambrick (2007), who lamented that other fields do not have the management science/organizational behavior obsession with theory for theory's sake (TFTS), and are more concerned with finding answers to important problems or questions. For example, none of the epidemiological research on the effects of smoking would have been published in a TFTS journal. Similarly for a host of other important questions.

Other reservations about the dominant emphasis on TFTS have been expressed by Anderson et al. (2001), Ghoshal (2005), Helfat (2007), Miller (2007), Pfeffer (2007, 2014), Schmidt (2009), Davis (2010), Leavitt, Mitchell, and Peterson (2010), Ferris, Hochwarter, and Buckley (2012), Nosek, Spies, and Motyl (2012), and Schein (2015). We offer the following compilation of their reservations.

- The vast majority of new theories that are published are never tested. Of those that are, the number of empirical tests, with rare exceptions, is limited to one. Consequently of what value are the hundreds of new, novel, and interesting theories that have been published?
- The consuming emphasis on theory creation as the end goal drives out replication, which severely limits the incremental accumulation of reliable knowledge about important issues. Consequently we cannot discover the conditions under which an important relationship holds, and the conditions under which it does not.
- The overabundance of new theories, and the lack of replication and pragmatic empirical research,

make teaching the substantive content of management and organizational behavior difficult because reliable substantive content does not accumulate.

- The extreme over-emphasis on theory that is new and novel simply leads to much more cumbersome, difficult to understand, and unhelpful verbiage. It escalates the problem of translating very pretentious abstract language into a more direct and useful discourse.
- Related to the above is the outcome of construct proliferation. Virtually everyone wants to invent their own terminology (perhaps because it is a way of 'branding' one's work). For example, in their meta-analysis of the 'cognitive underpinnings of effective teamwork', DeChurch and Mesmer-Magnus (2010) were forced to consider 54 different terms describing 'team cognition' constructs (see their table 1, p. 39). Sitzmann and Ely (2011) had a similar problem when trying to meta-analyze studies of attempts to train individual self-regulation.
- A corollary of the dominance of TFTS is the designation of empirical research on specific problems that the researchers think are important, as unfit for publication if it is not for the purpose of advancing new theory. The researchers may have good reasons for posing such questions, and may have clear specifications for what should be measured and how. However, the lack of formal theory, propositions, hypotheses, and all the other trappings of 'good' theory preclude publication, no matter how important or interesting the results.
- Finally, Greenwald, Leippe, Pratkanis, and Baumgardner (1986) make the argument that 'theory' can actually obstruct research progress. That is, theorists have a strong motivation to support hypotheses derived from theory and to neglect investigation of the conditions under which a hypothesis is true, and the conditions under which it is not. Consequently, theory testing is virtually always biased. Currently, there is no better illustration of this than the analyses presented by Bosco, Aguinis, Field, Pierce, and Dalton (2016). They reviewed data from 144 primary studies that addressed nine specific research questions at least 10 times each, and also from a major meta-analysis of the job satisfaction–job performance relationship. They compared effect sizes when the effect was formally hypothesized to be true and when it

was simply stated as a research question. If the effect was formally hypothesized, the mean was larger than if it had been stated as a question to be addressed. They tested 13 possible explanations for the difference, with nil results. The only plausible explanation was HARKing (Kerr, 1998), or hypothesizing after the results are known, which was expressly admitted by a number of investigators.

The overall conclusion here is that the proliferation of new theory for new theory's sake has done great damage to the advancement of *knowledge* in the work and organizational sciences. It should, and *must*, stop.

Some Counter Arguments

So far, there have been a small number of counter arguments to the assertion that producing TFTS is not a useful goal. Speaking for management science and organizational behavior, Hillman (2011) argues that we still have too little theory, rather than too much. The number of theory papers submitted to management journals has not increased, given the growth of the field, and this represents a deficiency. A number of reasons are offered for why 'theory' submissions are not going up, such as: the perception that there are too few outlets for theory papers; writing theory is too 'hard'; and doctoral training emphasizes training in research methods rather than training in how to write theory. Hillman advocates more graduate training in how to construct theory. She urges that construction of a theory be made a part of every dissertation requirement, and argues that such training would give management scholars a competitive advantage, compared to other scholars (who are not identified). 'We cannot simply be guided by what the data tell us' (p. 607). Hillman's comments are reinforced by Devers, Misangyi, and Gamache (2014). Reio (2010) says much the same thing regarding theory and research in human resource development. That is, constructing theory is the end goal, no matter what the critics say.

A more nuanced rebuttal is given by Suddaby (2014). He acknowledges the criticism, but argues that theory production is the scapegoat for many of the negative outcomes listed in the previous section. The real villain is 'fetishistic' theory, which is characterized by (a) excessive *rationalism*, (b) *scientism*, and (c) a lack of *reflexivity*. That is, a theory cannot be primarily based on non-empirical rational arguments. Neither can it be

based on the *appearance* of being scientific, and limit itself to explaining the obvious, or to re-characterizing existing knowledge. It cannot assume that organizations, and the people in them, will not change as the result of theory and research being directed at them. Finally, the lack of self-reflexivity means that we ignore the history of theory and research in a particular area. We assume that knowledge builds as a matter of course, and we focus only on 'recent' theory and research without considering the pluses and minuses of the entire record. Consequently, theory that is rationalistic, scientific, and non-reflexive is what contributes to the negative outcomes noted in the previous section. 'Good' theory is not the culprit.

We have three reactions to Suddaby's arguments. First, his specifications for fetishistic (was this word necessary?) are not quite what we mean by TFTS, and we think TFTS is a much more serious problem. Again, TFTS simply functions as the primary goal. It is not a means to an end, it *is* the end. It is an empirical question as to the proportion of current theory in the literature that exhibits the characteristics of TFTS. Our personal observation is that it is very high, perhaps approaching 80–85 percent, or greater. Second, no matter how it is packaged or scapegoated, the goal of such theorizing is still TFTS. Consequently, to achieve this goal, the theory literature advocates that graduate education should include much more training in how to develop 'good' theory, including more exposure to the arts and humanities. By implication, expertise in substantive content and research methodology are of less importance. Third, Suddaby makes an explicit assertion that the opposite of TFTS is dust-bowl empiricism, or the random accumulation of data that cannot be integrated and has no logic or meaning. We can think of no published studies that belong in such a dust bowl; not even the hundreds of studies that estimated the correlation of cognitive ability with performance in a work role. The research record has produced robust estimates of this correlation, identified the conditions under which it holds, and the conditions under which it does not, and explored the reasons why it is found. This publication record would not have been produced in TFTS journals. We could also ask whether the goal of new TFTS has also restricted knowledge accumulation on such topics as work motivation, team performance, employment contract effects, virtual leadership, etc. Miller (2007) cites a number of important findings across a range of disciplines that would never have seen the light of day under TFTS strictures. Observation and description have themselves produced many important discoveries, in all sciences. The worship of TFTS

should stop. Unfortunately, journals, such as the *AMR*, still strongly advocate using PhD training time to teach how to build TFTS (e.g. see Byron & Thatcher, 2016).

THEORY: THE POSITIVE SIDE

In spite of the negative tone of the preceding sections, we are not anti-theory or atheoretical. When theory is defined in terms of the basic four ingredients discussed previously, it is absolutely vital, both to IWOP and to each of us personally. Since the multiple positive roles of theory may not always be appreciated or acknowledged, a reminder list is given below, synthesized from a number of sources (Cronbach, 1986; Dubin, 1969, 1976; Landy & Vasey, 1984; Whetten, 1989). It is an abbreviation of what the first author has said before (Campbell, 1990).

- Theories tell us that certain facts among the accumulated knowledge base are important, and others are not (e.g. job commitment and job engagement may not be different things).
- Theories can give old data new interpretations and new meaning (e.g. validity coefficients are most certainly not 'situation specific').
- Theories identify important new issues and prescribe the most critical research questions that need to be answered to maximize understanding of the issue.
- Theories provide a means by which new research data can be interpreted and coded for future use (e.g. see Campbell, 2013).
- Theories provide a means for identifying and defining applied problems.
- Theories provide a means for prescribing or evaluating solutions to applied problems.
- Theories provide a means for responding to new problems that have no previously identified solution strategy.

Useful theories do these things well. While the list should be relatively noncontroversial, other issues are more hotly debated within the philosophy of science. The formal nature of knowledge, the relativism of facts, the form of the correspondence between the physical world and the verbal description of it, the nature of the interaction between a substantive theory and the idiosyncratic theory held by the investigator, and differences in the formal structure of knowledge across disciplines are examples of the kinds of issues considered by

the philosophy of science. This is not the place to discuss them. A number of excellent summaries have appeared (Earman, 1983; Kourany, 1987; Salmon, 1989; Savage, 1990), and these can be read and enjoyed. However, they really have little to do with substantive prescriptions for what questions should be investigated and how research should proceed.

Having said this, there does seem to be a consensus in the 'philosophical' literature that science does not really 'test theories' with the goal of building a repository of well-supported theories. Theories are not ends in and of themselves. Science attempts to establish facts that have known boundaries (e.g. McGuire, 1983) and the goal of the investigator should not be to 'test' a hypothesis to determine if it is true or false, but rather it should be to determine the conditions under which a substantive hypothesis, relationship, or proposition holds, and to what degree. Also, negative results could be more valuable than positive results if they suggest a very important limiting condition that should be studied further, or identify a range of conditions under which relationships do not hold.

Is Better Theory a Remedy?

If theory is so all-pervasive and such an important part of all aspects of research and practice, then the quality of theory itself must provide many degrees of freedom for the remedial treatment of any discipline's problems. In retrospect, this surely must be a major reason for the many lengthy discussions of the state of theory as theory during the last 40–50 years. Yes, better theory is always of value, to both the science and practice of IWOP, but only as long as two things are kept in mind.

Theory is not the dependent variable

There is obviously a set of reciprocal relationships among theory, research, and practice. Theory informs research; research informs theory; practice informs research; and similarly for any other pair of this trilogy. However, as we have already said repeatedly, better theory is not an end in itself. It is not the end goal. The end goal is the establishment of reliable and valid empirical research-based substantive knowledge that is important for one or more of the first four goals we discussed previously. 'Theory' is just a means to get there, and it is not the only means. Research can start because of questions raised by practitioners, crisis situations, or researcher curiosity. A case in point is the accumulating knowledge on

the effects of goal setting on individual performance. Locke (2007) makes a powerful argument for induction rather than theory building. Better theory is just a means to an end, and 'improvements' in theory should always be discussed in that context. It is difficult to imagine that very useful theory could be created by someone who only knew the general rules of theory development and had never spent time in an organization, never tried or intended to collect data, and knew nothing of measurement and other methodological issues. It's like trying to get papers published by casting them into the right form and reinforcing the editor's current bias rather than worrying about whether the substantive empirical results are worth preserving in an archival journal. We want better theory because it may help us develop better research questions, provide more useful interpretations of data, or guide the future investment of research resources. It is an independent variable.

Form versus substance

The literature on theory in IWOP and management does seem to spend a great deal of time on the form of theory and not the substance. Specific examples are not used with any great frequency even to illustrate the meaning of a concept or the difference between two constructions. It is as if the most important facet of improved theory development is learning how to produce the best form. Nothing could be more mistaken. While it is certainly important to avoid major errors in logic or rules of inference, such necessary but not sufficient considerations pale beside the value of better *substantive* ideas. The most elegant formalisms in all of theory creation cannot substitute for better ideas and better substantive paradigms. The medium is not the message.

The issue here is somewhat analogous to the distinction in cognitive psychology between general and domain-specific problem-solving skills. For example, if we want to teach people how to be better problem solvers, should the training content consist of teaching general problem-solving rules and procedures, or should it be concerned with domain-specific knowledge, skills, and heuristics? Research on the issue is now reasonably definitive. Mastery of some general principles will help a little bit, but that is not what produces experts in a field. We do not learn 'how to think'. We learn a lot about a specific field or topic. Experts simply know more and have their knowledge better organized, codified, and accessible. Their problem-solving strategies may indeed be even simpler than those of the novice (see the discussion in Campbell, Kuncel, and Kostal, Chapter 19, this *handbook*).

For IWOP, domain-specific expertise must encompass knowledge of what actually goes on in organizations, a full mastery of the extant literature, and a thorough mastery of a wide variety of methodologies. Better theories should consist of better substantive ideas about what things mean, how things work, or what the serious problems are. The word theory really does not need to be used. Better substantive ideas will result from more expert knowledge and skill, engaging in a wider variety of professional experiences, and confronting the problems of interest directly (Campbell, Daft, & Hulin, 1982). That is, if one is interested in problems in personnel selection, then the researcher must get out and rub elbows with the people doing it and listen to user descriptions of the problems. True expertise will then permit the quick and accurate translation of the user language to the language of the discipline. Generally speaking, we cannot stay in our offices too much, nor can we avoid a lifetime of hard work developing and maintaining an expert knowledge structure. Bad-mouthing an intense concern for measurement, methodology, and empirical results is a characteristic of novice thinkers, and will not work as an excuse for avoiding mastery of such topics.

Substantive Concerns

In 1990, the first author (Campbell, 1990) recalled that IO psychology underwent a series of self-examinations during the early 1970s. Two American Psychological Association symposia published in *PPsy*, 'On Becoming a Psychologist in Industry' (R.J. Campbell, 1970) and 'Research Models of the Future for Industrial and Organizational Psychology' (Barrett, 1972), are especially noteworthy, as are two invited addresses, 'Fads, Fashion, and Folderol in Psychology' (Dunnette, 1966) and the 'The Shadow and the Substance' (Bass, 1974). A number of themes sounded the same then as they do now. For example: the comparison of the social sciences with the physical sciences was described as misleading; statements like 'The difference was statistically significant at alpha equals .05' are labeled as uninformative at best; and theory construction for theory's sake was seen as an interesting game but not science. It is also a bit eerie to read Barrett's (1972) suggestions for more collective efforts to identify critical research problems and to monitor the progress of the field toward solving them. He actually suggested creating a series of permanent study panels, much like engineering societies have, to continually articulate

new problem areas, evaluate progress, and codify what we know. He also articulated the need for changes in our research and development structure. Perhaps we should ask why these and similar suggestions have not been acted on during the ensuing 40+ years. After all, our field deals with some of the most important issues that people and organizations encounter over their life span. The world of work is very large and a very crucial part of almost everyone's life (Hulin, 2014).

As an alternative to the creation of new and novel theory, as an end in itself, we should get back to Barrett's suggestion and attempt to identify the most pressing substantive questions, problems, and issues that we face in our attempts to: (a) improve individual, group, and organizational functioning; (b) improve the well-being of individuals in their work roles; (c) contribute to the common good; and (d) advance the science of human behavior at work. We do these things piecemeal now, in the form of occasional conference symposia, occasional special forums, etc. but it would be useful to have a systematic continuing full-scale debate across the entire field (i.e. IWOP) about our most pressing substantive concerns. The discussion and debate should take many forms, ranging from regular and recurring conference symposia, to special journal issues, to reports by expert panels, to the solicitation of ideas from a wide variety of individuals. We must find ways to make such a discussion ongoing, wide ranging, and sustainable. It cannot be a limited, sporadic, or one time effort, and all of us must be involved. Questions we need to answer, given the first four goals discussed earlier, and not the generation of TFTS are the prime concern. There will never be perfect agreement, and there will be much argument, and counter argument. That is as it should be, but the focus must be on the most critical substantive issues, not on TFTS.

As an illustration of the distinction between using TFTS and the identification of important substantive questions that deserve intense research attention, consider the 2013 *AMR* special topic forum on 'Theories of Work and Working Today' (Okhuysen, Lepak, Ashcraft, Labianca, Smith, & Steensma, 2013). There are eight papers included in the forum and seven of the eight essentially make theory development the centerpiece. The lone exception is the paper by Cappelli and Keller (2013) that spells out a classification of new employment arrangements that populate the current economy (e.g. independent contractor, leased employees, on-call employees), and then discusses how our lack of knowledge about the determinants of, and effects of these different 'contracts' hurts our understanding of the world of work. The paper then suggests the pertinent research questions that

should be asked. We need many, many, many more such papers, and a moratorium on theory development for theory's sake. An example is a recent paper by Aguinis and Lawal (2013) which identifies a work role they call 'eLancing' which refers to the internet-based marketing of your own capabilities, and securing contracts to perform service for some range of clients. They then outline the HR-related research questions such work roles suggest.

Now, some will argue that theorizing plays an important part in the identification and investigation of important work and organizational behavior issues. As we noted above, this is certainly true; but, for the most part that is not the way theorizing currently works in much of today's literature. Creating TFTS is a much different enterprise. The emperor has no clothes.

A DARK FUTURE?

So far, we have argued that TFTS is having a negative effect on progress toward the first four goals discussed earlier. TFTS drives out a concern for empirical research on critical substantive questions, the answers to which would contribute to: a basic understanding of individual organizational behavior as it affects organizational effectiveness; the improvement of individual well-being in the work context; the improvement of the common good; and basic research for its own sake. TFTS does this because the goal of TFTS is really not to identify such critical questions or issues, and stimulate research on them, but to serve as the dependent variable itself. That is, creation of theory is the important end product. Empirical research only exists to enhance the perceived value of TFTS. The specific empirical results are not themselves important. Further, it is stipulated that TFTS must be new, novel, and interesting; and, the more we have of such theory the better. Further, *any and all* empirical research must be supported by 'theory', or it will not be reviewed for publication, no matter how important the empirical question might be to non-theoreticians. The conversation is to be about theory, not empirical findings. We agree with Cucina, Hayes, Walmsley, and Martin (2014), who see this as genuine folly. It is not a straw person.

As serious as the negative effects of TFTS are for the future of IWOP, they exist in a larger context that is even more serious. Across science in general, and the behavioral, social, and management sciences in particular, the integrity of the research enterprise itself is being seriously

questioned. It is put most starkly by Ioannidis (2005) who offers many reasons for 'why most published research findings are false'. The evidence he cites, and the conclusions he draws are echoed by many others.

We now consider, briefly, the major reasons that have been offered for why the published research record may be lethally flawed. While the current authors were aware of much of this literature before starting to write this chapter, reviewing the totality of it has proven to be unsettling. We are in fact facing a potential disaster. The major reasons are as follows:

The Destructive Adherence to NHST

All of us are familiar with the null hypothesis significance testing (NHST) model attributed to Fisher (1925) and Neyman and Pearson (1928). It addresses the question of how to model the decision about whether the results of a study can be given a substantive interpretation, or are just due to 'chance' (i.e. *random* sampling error). The decision is thus a dichotomous choice between saying a result is (statistically) 'significant' versus saying that it is not. The world of all possible results is divided into (a) the null and (b) all possible alternatives; and, on the basis of data we must choose between them. A type I error is deciding that the null is not true, when it is; and a type II error is deciding, for a particular alternative, that the alternative is not true, when in fact it is true. That is, a type I error can only occur when the null is true, and a type II error can only occur when an alternative is true. The probability of a type I error (α) is *solely* a function of the *pre-study* choice of the investigator about the degree of risk of being wrong he or she wants to assume. The probability of a type II error (β) is a function of the sample size, the specific value for the alternative, the reliability with which the variables are measured, and the level of α chosen by the investigators. $\alpha = .05$ is popular. Empirical results that are statistically significant are good. Results that are not statistically significant are of no interest, and a disappointment.

Beginning in the 1960s (e.g. Rozeboom, 1960; Cohen, 1962; Bakan, 1966; Lykken, 1968), and continuing to the present day, the NHST model has been soundly condemned by a wide variety of knowledgeable people in a wide variety of disciplines. The criticisms and condemnations have now reached book length (Hubbard, 2016). The Hubbard book, *Corrupt Research*, should be read by every graduate student, every professional HR practitioner, and every faculty member in IWOP

and related fields. It documents our own self-destructive tendencies, in excruciating detail.

The NHST model has many strikes (more than three) against it. For example,

- Statistical significance (SS) has nothing (we do mean nothing) to do with substantive significance.
- SS has nothing to do with the probability of replication.
- SS *should* have nothing to do with the probability of being published, but it does. The requirement for SS suppresses the probability of negative results being published.
- Reliance on SS suppresses efforts to increase power.
- SS motivates biased efforts to reject H_0 :
- SS leads to computing p -values after looking at the results. That is, after the results are known, and given the relative standard deviation (RSD) under H_0 , the probability (p) of the sample result is computed. Some might call this CpARKing. Computing p after the results are known is *not* an estimate of the probability of a type I error, and it is not an indicator of the magnitude of substantive effects.
- The SS of a sample result says nothing about the level of support, or non-support, provided for a theory.

The clear consensus among all knowledgeable people (there really are no dissenters) is that NHST should *never* be used. The magnitude of the result, or effect size, is what's important and the statistic of interest is the confidence interval (a statement of potential sampling error), which must be coupled with substantive arguments for why the effect size is worth knowing or using, including effect sizes of near zero. Moreover, benchmarks for the relative magnitude or importance of effect sizes are no solution. In a classic paper, Cohen (1988) offered suggestions for what sizes of r or d constitute small, medium, and large effects (e.g. correlations of .10, .30, and .50 are small, medium, and large). Bosco, Singh, Aguinis, Field, and Pierce (2015) show that in practice (i.e. in published articles) these terms are applied to effect sizes that are considerably smaller. However, relying on benchmarks is a poor substitute for reasoned arguments for why a particular effect size estimate provides useful information, given its confidence interval, and given the nature of prior information. That is, we must all be Bayesians to some extent and consider the Bayesian prior distribution, the Bayesian posterior distribution, and the

Bayesian credibility interval around the sample estimate (Kruschke, Aguinis, & Joo, 2012; Zyphur & Oswald, 2015). However, we still cannot escape the need for collective expert judgement, and the ensuing arguments about whether the collective expert judgement is reasonable. No science can.

What is disheartening is that while the negative utility of the NHST model has been known for over 50 years, the frequency with which it is used in published articles to interpret research results has been *going up!* Hubbard (2016, p. 233) includes a table that shows the frequency of NHST in management science and social science publications from 1960–2007. In the 1960s the frequencies were 52% and 56% for management science and social science respectively. In the 2000s the frequencies were 93% and 92%. What is perhaps even more disheartening is that the use of the phrase, 'the result was marginally significant' (presumably p -values slightly greater than .05) is also increasing across a number of sub-fields of psychology (Pritschet, Powell, & Horne, 2016). It seems like a desperate grasping for 'significance' in hopes that editors, reviewers, and readers will not discard a paper, with results that are 'almost significant', on the trash heap of negative results. Not to be pretentiously Shakespearian, but there is indeed something rotten in our research publication system. For example, in structural equation modeling (SEM), if the 'fit' of model A is statistically significantly better than the fit of model B, we have learned virtually nothing. See also Cumming et al. (2007).

The role of TFTS in increasing the use of NHST is important, and negative. To the extent that the current obsession with 'theory' is all consuming, it fosters the testing of formal hypotheses derived from theory. Hypotheses (and the theory from which they are derived) are 'supported' by results that are statistically significant. The substantive importance of the effect size seems of little importance to theory testing. Theory testing demands NHST. As noted previously, Bosco et al. (2016) have demonstrated, using a large sample of studies from *JAP* and *PPsy*, that if a specific relationship is 'hypothesized' to be true the effect size will be larger and the frequency of statistically significant results will be larger than if no formal hypotheses had been made, relative to the *same* relationship. A possible explanation for this difference is given in the next section.

We should end the obsession with NHST, and with the 'testing' of formal 'hypotheses' which demand statistical significance. This also means ending the obsession with TFTS. Orlitzky (2012) argues that this may be easier said than done. Our current IWOP theory and research culture supports NHST. This culture must be changed, which

will also entail the way we choose and frame research questions. Such changes have been happening in other disciplines, particularly in medicine (Schwab, Abrahamson, Starbuck, & Fidler, 2011). If others can do it why can't we.

Some well-meaning statisticians find the total rejection of NHST for interpreting the results of research a bit tough to take, and describe situations for which it might be useful (e.g. Krantz, 1999). However, all the examples recognize the flaws in using *unconditioned* prior and posterior probability distributions to make a *dichotomous* significant versus not significant decision. All such decisions must be conditional on expert *substantive* judgement (e.g. see Gelman, 2013). Computing and using a confidence interval to determine if it does or does not include zero is just NHST all over again. The confidence interval simply informs expert judgement about the expected sampling error in empirical estimates of effect sizes (ES). Bayesian estimation revises the computation of the confidence interval based on the inclusion of prior information.

Recently, the editorial policies of the *Strategic Management Journal* have been changed to reflect the editor's misgivings about NHST (Bettis, Ethiraj, Gambardella, Helfat, & Mitchell, 2016). Reports of nil results will be welcomed, as will submissions of replications. Papers using only NHST to portray the 'significance' of the results will no longer be accepted. Such policy changes are good news. We hope that the editors will firmly withstand any backlash that ensues.

Publication Bias and the Use of Questionable Research and Analysis Procedures (QRAPs)

It has now been well established that in many sciences virtually all published empirical findings are 'positive'. That is, the data confirm the expectations of the researchers and/or reject the null hypotheses virtually 90–95 percent of the time (e.g. Fanelli, 2010, 2012; also Bakker, van Dijk, & Wicherts, 2012; Kepes & McDaniel, 2013; Simmons, Nelson, & Simonsohn, 2011; Sterling, Rosenbaum, & Weinkam, 1995). Do we never make an error in predicting empirical results? Can such a research record be possible? Is it always in the best interests of advancing our state of knowledge that we are only interested in, and only predict, 'positive' results, never nil or negative effects?

One frequently offered explanation is 'publication bias'. That is, several (all?) of the relevant players in the research publication process are biased

toward publishing positive results (Ioannidis, 2008, 2011). A comprehensive listing of possible sources of publication bias is provided by Banks and McDaniel (2011). They list 29 reasons why positive results might be favored. For example, journal editors prefer results that are statistically significant and support theory; and that are new, novel, and interesting (in their opinion). Realizing journal editor preferences, authors do not submit research reports showing small, near zero, or negative results. Also, authors perceive statistical significance to be a requirement for publication. In addition, even if a research report is accepted for publication, editors or reviewers could request that zero or negative results be removed to save space, or because they are deemed not relevant (Banks, Rogelberg, Woznyj, Landis, & Rupp, 2016).

Aside from the intuitive conclusion that results can't possibly be as positive as they are portrayed in the published literature, is there empirical evidence to suggest that publication bias exists? In a word, yes. For example, Banks and O'Boyle (2013), Mazzola and Deuling (2013), and O'Boyle, Banks, and Gonzalez-Mulé (2014) examined the increase in 'positive' results and the decrease in negative results when dissertations were compared to the published articles based on them. The differences were sizeable. Something indeed happened on the way to publication, and it might reasonably be called publication bias.

The prevalence of publication bias in existing meta-analyses of various IWOP-related research questions has been investigated by Ferguson and Brannick (2012), Kepes, Banks, McDaniel, and Whetzel (2012), and Kepes, Banks, and Oh (2014). Ferguson and Brannick (2012) looked at 91 recent meta-analyses, 70 percent of which attempted to analyze publication bias, primarily by comparing published to unpublished studies. For a subset of 48 meta-analyses, there was sufficient information to use more sophisticated methods (e.g. funnel plots, trim and fill). About 25 percent of the estimates in this subset showed evidence of some degree of publication bias (i.e. there were more positive results than there should have been, given reasonable statistical assumptions about how the individual study estimates of effect sizes should have been distributed). Surprisingly, there were essentially no differences in bias for the published versus unpublished studies. Publication bias was apparently coming from other sources. Dalton, Aguinis, Dalton, Bosco, and Pierce (2012) reaffirmed this conclusion.

For the Kepes et al. (2012) and Kepes et al. (2014) analyses, a total of five specific meta-analyses of IWOP-related research questions (e.g. predictions of performance from assessment center information, male–female differences in

transformational leadership) were evaluated for publication bias, using multiple methods (i.e. virtually every available method). Both papers give a thorough, but concise, description of each method (e.g. trim and fill, contoured funnel plot, rank correlation, test of the intercept, *cumulative* meta-analysis). There are pros and cons for each of the methods. However, none of them can account for qualitative, and unknown, differences between small-N and large-N studies, or for substantive moderators that could account for the observed bias, but were not analyzed. The extent of publication bias varied across the five meta-analyses, from essentially none in two of them to moderate levels in the other three. In sum, the authors of all three papers concluded that publication bias is an issue in meta-analyses conducted on IWOP-related research, but more research is needed before drawing conclusions about its seriousness, or how best to detect it. Fortunately, a content analysis of 196 meta-analyses by Aguinis, Dalton, Bosco, Pierce, and Dalton (2011) showed that numerous analytic decisions (e.g. rules for excluding studies, meta-analytic model used, range restriction corrections, type of effect size, etc.) did not seem to effect estimated effect sizes. If there is publication bias in such meta-analyses, it is not coming from analytic decisions.

Bakker et al. (2012) analyzed the study results in a different set of meta-analyses across different areas of psychology, not including IWOP. Based on the low levels of statistical power in most of the studies, and the resulting funnel plots, they concluded there simply could not be such a high proportion of positive results, even if reasonable H_A 's were in fact true. Something artifactual was pushing the level of positive results higher. In their estimation, such artifacts, which we might call 'questionable research and analysis practices' (QRAPs), account for 40–50 percent of positive findings. In his classic paper, Ioannidis (2005) went further and asserted that virtually all published positive research results (in medical research) are false, or seriously inflated (Ioannidis, 2008). Ioannidis and Doucouliagos (2013) draw similar conclusions about research in economics.

What kinds of QRAPs are responsible for this artifactual inflation of positive results, presumably brought on by the need to publish only positive results? A major recent review of the evidence pertaining to the nature and extent of questionable research and analysis procedures is provided by Banks et al. (2016a). They conducted a systematic review and summary of 64 studies that investigated QRAPs of various kinds across all fields. There were four primary types of evidence: (1) observations of how protocols, dissertations,

and conference papers are transformed to published articles; (2) sensitivity analyses of the probabilities of certain results; (3) self-report surveys; and (4) observer reports of what other investigators have done. The general findings were that QRAPs are extensive, frequencies vary by type of QRAP, are higher for observer reports than for self-reports, do not vary across academic rank, and are sometimes encouraged by editors and reviewers. The major kinds of QRAPs, most of which attempt to change p -values, are the following:

- a Continue to add participants until significance is reached.
- b Delete outliers.
- c Omit certain independent, dependent, or moderator variables after looking at the data.
- d Change the nature of the hypotheses or research questions after the results are known, otherwise known as HARKing (Kerr, 1998).
- e Cherry pick 'fit' indices when comparing solutions.
- f Round ' p ' downward.
- g Incorrectly report, or incorrectly calculate, statistical results, usually in favor of rejecting H_0 : (Bakker & Wicherts, 2011).
- h Keep repeating a study until statistically significant results are found. Report only the positive results.

While acknowledging that such practices may not have been intentional, various remedies have been proposed (Banks et al., 2016b; Simmons et al., 2011). For example, Banks et al. (2016b) recommended: (1) changing how journal submissions are reviewed and judged to be publishable (e.g. be more accepting of *null* results); (2) changing how graduate students are trained (e.g. emphasize a culture that discourages QRAPs); and (3) conducting more research on QRAPs. All of these are well and good, but they do not address the fundamental problem, which is the power of Goal 5 and the academic incentive structure that supports it. That is, if positive results are necessary for getting published, and if the number of publications and citation counts strongly influence promotions and salary increases, then QRAPs will be rewarded. Please see the devastating discussion in Hubbard (2016, chapter 8).

Unfortunately, there is evidence in the studies reviewed by Banks et al. (2016a) that investigators sometimes *intentionally* attempt to bias research outcomes toward positive results that reject H_0 or support their substantive predictions. There are two general approaches, via anonymous surveys, to obtaining such data, in addition to identifying

specific individuals who have committed fraud via whistleblower testimony. The survey can either ask the respondents to admit doing certain things themselves, or the respondents can be asked whether they have seen colleagues commit specific acts. Assuming that specific admissions are an underestimate (i.e. not all would make such admissions) and reports about others are to some degree an overestimate, a reasonable in-between judgement is that the rates are quite high (see also Bedeian, Taylor, & Miller, 2010; Fanelli, 2009; John, Loewenstein, & Prelec, 2012). For example, the incidence of actually falsifying data is most likely between 2 and 8 percent, and the incidence of withholding data after looking at the results is between 40 and 50 percent.

These results are unsettling, particularly for research based on experimental manipulations. The increased use of samples obtained via the internet (e.g. Mechanical Turk) and its attendant flexibility only heightens the concern. If we do not address these issues forthrightly, we are in danger of losing our credibility. Most of the research on QRAPs does not use data from IWOP (see Kepes & McDaniel, 2013), and we might hope that because of less frequent use of the laboratory experimental method and the fact that many of our data sources are controlled by independent parties, QRAPs may be less of a problem for IWOP (Sliter, Yuan, & Boyd, 2013). However, at this point we can only hope. More investigation is needed.

Replication as a Necessity

For many reasons, one being as a counter to publication bias, replication of empirical findings in the sciences is seen as an absolute necessity by virtually everyone (e.g. Hubbard, 2016; Pashler & Harris, 2012). This necessity can be contrasted with the perceived lack of replication that is observed in the psychology, economic, and management science literatures (Makel, Plucker, & Hegarty, 2012). Ioannidis (2012) has commented that science must be self-correcting and a lack of replication runs the risk of perpetuating false conclusions. We do in fact have a replication crisis in behavioral and social science, or at least in many of its important domains (Pashler & Wagenmakers, 2012). If not addressed it will severely damage IWOP and management science as legitimate scientific enterprises. They will be relegated to the status of fortune telling, guru-of-the-month pontification, or literary criticism, all of which may have their place, but they are not science (Giner-Sorolla, 2012).

Unfortunately, what is meant by ‘replication’ is not without argument. Is it a high fidelity repeat of the original study by the original investigators using the same measures, the same procedures, the same subject population, and the same analysis methods? Is it all of the above, except that the investigators are different from, and independent of, the original investigators? Is it a ‘conceptual’ replication in which the measures may be different, the subject population is different, and the procedures may not be identical, but the hypothesis or question being addressed is the same? Does replication imply that the original study was repeated just once? Does the term replication refer only to the repeatability of positive results, and replication is not a requirement for null or negative results? Fortunately, these complications have been discussed at some length in the literature. A brief summary is as follows.

Pashler and Harris (2012) argue strongly that conceptual replications have very little value. They can be susceptible to publication bias (via QRAPs) and in need of replication themselves. Further it is not obvious what a conceptual failure to replicate means. Conceptual replication introduces a new set of reasons why the new study may not agree with the original. Consequently, very little is learned about the validity of the original results from one conceptual replication. A ‘contrary’ view is expressed by Schmidt and Oh (2016) who argue in favor of conceptual replications (plural) that can provide enough studies for a meta-analysis. However, when read carefully the two sides are not really in disagreement. If the same *constructs* are being measured, or represented by the experimental treatments, and multiple studies are carried out, then there is little disagreement.

In general, if a study is intended as a ‘replication’ of a prior study then a few basic guidelines should be followed. Brandt et al. (2014) present a recipe that they believe should be followed, in the form of six basic ingredients (p. 218). The most critical are: (1) a strong argument should be offered that the measures and/or the experimental treatments represent the same constructs as in the original, which is a construct validity issue; (2) sample sizes should be large; (3) the procedures in the original study should be followed as closely as possible; and (4) *complete* details about the replication should be made available to all interested parties.

Given the perceived lack of published replications in behavioral and social science, a group of psychologists (Open Science Collaboration, 2012) proposed a large crowd-sourced attempt to replicate a number of key initial research findings in psychology. It is called the ‘Reproducibility

Project'. A study selection team identified a set of study results from the first 30 articles published in 2008 in each of three different journals: (1) *Journal of Experimental Psychology: Learning, Memory and Cognition*, (2) *Journal of Personality and Social Psychology*, and (3) *Psychological Science*. Research teams (not the original investigators) were solicited to conduct a direct replication of each of the original studies. That is, the instrumentation, subject pool, settings, and research procedures were to be repeated with as much fidelity as possible. The original investigators could review and comment on the replication design. The replications were required to have a statistical power equal to, or greater than, .80. Given the nature of the three journals, most of the original studies were experiments, and not estimates of correlations between two or more measures of individual differences (e.g. a personality dimension and an indicator of job performance).

The results of the reproducibility study were published in *Science* in September of 2015. One hundred studies were replicated, and several different indicators of replicability were used (e.g. statistical significance, p -values, effect size of the replicate compared to the effect size for the original, average effect size for the original plus replicate, and the collective expert judgements of the replicating teams). The different indicators were relatively consistent in showing that the replication results were positive, but generally weaker than the original results. For example, the mean replicate effect size was about half the mean effect size for the original studies, but virtually all were in the same direction. The authors are quick to point out that a number of factors could contribute to smaller replicate effect sizes. For example, the replicate teams may not have been able to reproduce all of the original study features in the replicate procedure, and there may have been a certain amount of publication bias (via QRAPs) in the original studies, that was not reproduced in the replicate. There is also the influence of sampling error itself. However, it is somewhat reassuring that the moderator with the largest influence was the magnitude of the original effect size. Also, one replicate is just the beginning and not the end of the replication story, as the authors explicitly state. Some further elements of this story are the following.

Maxwell, Lau, and Howard (2015) argue strongly that a single replication may not tell us much, depending on the sample sizes (i.e. statistical power) of both the original study and the replicate. The power of the replicate depends in part on the specific effect size of interest, which may be problematic. Further the sample sizes necessary

for tests of 'equivalence' between the original and replicate results can border on the astronomical (see their table 1, p. 495). Consequently, a single replicate can virtually never be said to 'support' or 'fail to support' the original finding. Further, sample sizes and the true effect sizes are not the only influence on power. The reliability of the dependent and/or independent variables can also play a major role (Stanley & Spence, 2014). Less than perfect reliability lowers power and could lead to greater variation in effect size estimates across studies. For example, if the original study capitalized on higher than average reliability for the measures that were used, the probability of replication goes down. Patil, Peng, and Leek (2016) acknowledge these points and argue from a simulation study that the results of the Reproducibility Project are about what we should expect. It was not a failure. Unfortunately, the media focused on only one (highly flawed) indicator of replicability, whether or not the result was 'statistically significant' in both studies, which happened 36 percent of the time.

Another 'crowd-sourced' effort to estimate replication success has been termed the 'Many Labs Study' (Klein et al., 2014). In this effort, 13 well-known experiments were each replicated several times and a number of the original authors commented on the results (e.g. Monin & Oppenheimer, 2014). As would be expected there was more stability in the mean replication effects than in the single replication effects in the Reproducibility Project. The lack of at least moderate replication levels for two of the studies could be attributed to moderator effects, but obviously more research is needed.

Both Braver, Thoenes, and Rosenthal (2014) and Tsuji, Bergmann, and Cristia (2014) acknowledge that multiple replications are necessary and argue that replication should be conceptualized as a continuing ongoing meta-analysis where the critical question is not whether the original study is replicated by subsequent studies, but what is the mean effect size across all studies, including the original. The estimate of the mean effect size, and its standard error, are thus updated continuously. Whether the current emphasis in the major IWOP and management journals on TFTS will allow such data accumulation to occur is another matter. We think it will not. Consequently, TFTS is counterproductive for establishing substantive findings that are reproducible, under specific conditions.

Finally, Larzelere, Cox, and Swindle (2015) and Locke (2015) point out that multiple direct replications are still not the end of the story. Subsequent research should also attempt to account for the effects of important moderators

and critical confounds that can reliably influence the effect size. That is, there is not a constant effect size that should always be reproduced (Gelman, 2015). Again, we would like to know the conditions under which a result should occur, and the conditions under which it should not.

The rebuttal to the expressed need for multiple replication and estimation of important moderators is that such an emphasis on replication will inhibit the publication of original research and the pursuit of new ideas. That is, would a new idea ever be published (Bartlett, 2014)? The authors of the Open Science Collaboration (2015) recognize this issue and state quite emphatically that both innovation and verification are necessary for the advancement of any science. We all have an obligation to support both. However, it is currently the case that the scales are tipped almost exclusively toward the new and the novel, and not verification. If this continues to be the case, a science cannot progress, or even continue to exist for very long.

Among others, Koole and Lakens (2012) and Schmidt and Landers (2013) suggest ways that replications of critical study results could/should be facilitated.

- Replications should be published in archival journals, but perhaps in summary form (i.e. 1–3 pages) with the full descriptive discussion made available in an easily accessible archive.
- Conducting replications should follow the rules of research etiquette and ethics suggested by Kahneman (2014).
- The incentive structure for academic researchers must be changed. That is, Goal 5 cannot stand in its current form.

Again, the objective is not to ‘replicate’ the results of a single index study but to estimate the effect size in the population, or in important sub-populations produced by moderating conditions. Accurate estimates require multiple replications, which permit a meta-analytic summary. Schmidt and Oh (2016) argue that, within IWOP, there has been sufficient replication to permit reasonably definitive meta-analytic estimates of a number of important effect sizes (e.g. the correlations of general mental ability, personality, and interests with job performance, the effects of specific versus do-your-best goals, the effectiveness of skills training). They also cite Richard, Bond, and Stokes-Zoota (2003) who document over 300 meta-analyses in social psychology, and Lipsey and Wilson (1993) who argue that there is considerable meta-analytic evidence supporting the efficacy of certain treatment effects in

education and clinical treatment. Ones, Viswesvaran, and Schmidt (2016) make the case that meta-analyses have not yet taken full advantage of already existing data, particularly with regard to specific HRM practices. They document a number of data sources (e.g. conference papers, practitioner research reports) that are typically missed by automated searches. They argue that we already have more replication than we realize that would permit meta-analytic estimates of important effect sizes. We should get on with it. While all this is certainly true, much, much more needs to be done, and the forces acting against replication are much stronger now than even 20–25 years ago.

THE FIFTH GOAL

An important component of our darkening future is a transformation in the strategies used to achieve the Fifth Goal listed in the earlier section entitled ‘Who Benefits’. That is, an important goal for theory and research in IWOP, management science, and virtually all of science for that matter, is to advance the careers of individual practitioners, researchers, and theorists. The existence of this goal is nothing new, and it will always be with us (Lawrence, 2003). What is new is the increasing dominance of the Fifth Goal, and the means used to achieve it, compared to the other four. (Starbuck, 2007).

There are several players in the pursuit of the Fifth Goal, and they form an interrelated system. Individual researchers and theorists want to be recruited, hired by prestigious organizations (e.g. universities), promoted, and well compensated. Nothing wrong with that. Organizations such as university departments want to hire talented and productive people such that the organization will become profitable and prestigious, or at least approach prestigiousness asymptotically. Nothing wrong with that. Journal editors want their journals to grow in circulation, and in perceived importance to the discipline, and in attractiveness to potential contributors. Nothing wrong with that. Journal publishers, and book publishers, want to make money, and build the prestige of *their* organizations. Nothing wrong with that.

Ideally, practitioners, researchers, and theorists would be hired, promoted, and paid well on the basis of the impact and importance of their substantive contributions to one or more of the first four goals. Journal editors would be rewarded for attracting and publishing theoretical analyses and

research reports that address important and critical issues pertaining to the first four goals. Publishers would build profits and prestige because the journals and books they publish would contribute to one or more of the first four goals.

In the opinion of many observers (e.g. Honig, Lampel, Siegel, & Drnevich, 2014), the assessment procedures used to measure the importance and value of researcher, theorist, editor, publisher, or organization contributions to one or more of the first four goals have changed significantly. In place of judgements by knowledgeable people (e.g. promotion and tenure committees) of the value or importance of contributions to the first four goals, difficult though they are to make, big data now rule. Consequently, it is no longer the case that researchers and theorists, journal editors, and organizations are judged on the basis of their actual performance, but on the basis of outcome indicators that may or may not be a function of performance itself.

For the individual researcher or theorist, the outcome indicators that are now of greatest importance are number of publications and citation counts. Further, publications in some journals (i.e. the 'top tier') count more than others, and certain citation patterns count more than others (e.g. a high *h*-index).

Traditionally, an individual's citation count is obtained from the Thomson ISI Web of Science. More recently, Google Scholar is an alternative source. The two are different. Google Scholar covers a wider variety of publication outlets (e.g. books, referred conference proceedings), but also includes sources that might not be judged as 'scholarly' (e.g. books for the lay audience). From whatever source, there are alternative indices that could be calculated (e.g. the *h*-index, total number of citations, average number of citations per article, or per journal). The pros and cons of all of these alternative sources and alternative indices are thoroughly discussed by Harzing and van der Wal (2008). The choice of index can significantly impact an individual's standing in comparison to other individuals. Adler and Harzing (2009) recount a number of horror stories with regard to both the 'rankings' of academic departments and the assessment of individual performance. However, in the end they do not argue for the abolition of citations, number of publications, and number of publications in 'top tier' journals as countable indicators of performance. Their goal is simply to make such indices as 'unbiased' as possible. Ireland (2015) also seems to take such metrics as a given, but asks that they be carefully examined.

Similar to individual theorists and researchers, journals, and consequently journal editors are

now to be judged by their journal impact factor (JIF), which is the frequency with which articles in a particular journal are cited by authors. Again, there can be arguments over where to search for such citations (e.g. books? Popular magazines? Newspapers?), what time periods to cover, and whether searching a particular journal for citations to that same journal is permitted.

Finally, the rankings of academic departments, by a wide range of different ranking bodies, can be significantly influenced by the citation counts and number of publications of its faculty, as well as by the JIFs of any journals that it sponsors. Consequently, the various ways such big data can be created and counted are critical.

Count Enhancement

Given that the rewards for individual researcher and theorists, as well as the rewards for journal editors and departments, are now so closely tied to number of publications, (particularly in 'top tier' journals), citation counts (particularly a high *h*-index), and JIFs (particularly with regard to whether they are increasing), it is quite understandable that the affected parties will try to achieve higher counts, by whatever means possible.

There have been many discussions in the literature of count maximization tactics (e.g. Fanelli, 2010; Ferguson & Heene, 2012; Giner-Sorolla, 2012; Honig et al., 2014; Ilgen, 2007; Lawrence, 2003, 2008; Macdonald & Kam, 2007a, 2007b; Nosek et al., 2012; Starbuck, 2007). What follows is our summary of what these sources suggest are useful strategies for: (1) increasing the number of publications; (2) increasing citation counts; and (3) increasing a journal's impact factor (JIF), *in addition* to simply doing good work.

Increasing the number of publications

- Divide a program of research into as many publishable parts as possible.
- Do not submit replications. Few, if any, are accepted.
- Submit papers on new or novel theories for theory's sake (TFTSs).
- For empirical papers, include a detailed section on theory that 'seems' to pertain to the empirical question, and then formulate specific propositions and hypotheses. Have a file of such theories that can be pressed into service when needed.

- Address one or more 'gaps' in the prevailing theory or empirical record.
- Only submit empirical papers that show positive (i.e. statistically significant) results.
- Submit papers that deal with 'hot' topics, as determined from the topics that a journal publishes frequently. Pay particular attention to 'Tier One' journals.
- Do not engage interesting, important, or critical issues if it will require large or long-term time commitments that will delay being able to submit manuscripts for publication.
- Only accept papers that show positive results.
- Suggest, or require, that authors cite papers from the journal in question.

Summary

If publication counts, citation counts, and impact factors are the dominate indicators of faculty and journal performance, then following the above rules will have disastrous consequences for the advancement of IWOP, organizational behavior, and management science (see again Hubbard, 2016, chapter 8). Theory for theory's sake (TFTS) will be valued and promoted above all else. The actual substantive importance of theory and research for Goals One, Two, Three, and Four will be degraded. Replications will never take place. There will be very little motivation for researchers to engage critical issues and to value accuracy over publishability (e.g. Nosek et al., 2012). Fang and Casadevall (2015) argue that competition on such indicators drives out creativity and true innovation. Schminke (2009) notes that such goals can foster unethical publication behavior (e.g. attempting to publish the same study twice). Much of the damage has already been done. Starbuck (2007) argues that only 5–10 percent of theorists and researchers are concerned with Goals 1 to 4. As Macdonald and Kam (2007b, p. 713) put it, 'Publications are to be counted, not read'.

Increasing citation counts

- Publish a theory or review paper in a journal with a large circulation that publishes over a variety of topics (i.e. a journal that appeals to a general audience).
- Publish papers on 'hot' topics.
- Publish papers that challenge the conventional wisdom, regardless of whether it should be challenged or not.
- Have multiple, and we do mean multiple, co-authors, even if some of them really have had little or nothing to do with producing the paper.
- Maximize self-citations, and urge all co-authors to do likewise.
- Develop networks of other researchers and theorists who explicitly, or implicitly, agree to cite other members of the network as much as possible, and cite outside the network as little as possible, regardless of substantive appropriateness.

Increasing the journal impact factor (JIF)

- Accept papers for publication based on the editors' judgements of the likelihood that they will be widely cited, as a function of being a 'hot' topic or a topic of interest to the broadest spectrum of people in the field. For example, 'leadership' is usually one such topic.
- Do not accept replications, or papers that deal with an 'old' topic.
- Publish papers from 'big names'.
- Publish papers with multiple, and we do mean multiple, authors. It broadens the potential pool of authors who will cite the paper.
- Publish papers that deal with something new, or novel, or at least that appear to be new or novel.

SOME CONCLUSIONS

Again, we are not anti-theory. Theory serves important functions across the scientific spectrum. It provides explanations for critical or intriguing relationships among variables, including the relationships between interventions (e.g. training) and their outcomes (e.g. conflict reduction). Theory can suggest new relationships that should be studied, new constructs that should be assessed, and how interventions should be evaluated. It can provide new explanations that can be compared to 'old' explanations. It can make predictions about when and under what conditions critical outcomes should be observed. However, all such functions can be carried out without ever using the word theory, or dictating the nature of its formalisms, or giving philosophy of science, or Academy of Management, prescriptions for what constitutes 'good' theory.

The focus should be on identifying critical issues and questions that need to be addressed

with empirical research, so as to best serve the purposes of Goals One, Two, Three, and Four, or some combination of them. Here we are echoing the previous arguments by Drenth and Heller (2004) and Drenth (2008). We should all re-read them, repeatedly. When developing new theory is an end in itself, it becomes Theory for Theory's Sake (TFTS), and serves no scientific purpose. It may be a literary exercise that some people enjoy creating and reading, but it does not serve Goals One, Two, Three, or Four. It may serve Goal Five.

Goal Five, *as the assessment of progress toward it is currently operationalized*, is simply counter-productive. That is, while there is nothing wrong with wanting job offers, promotions, tenure, and salary increases, the substitution of number of publications, citation counts, and impact factors for the assessments of actual substantive contributions to Goals One to Four, as a basis for promotion, tenure, etc. is destructive. Consider just the following:

- The number of publications can be increased by choosing safe topics that journals currently like, breaking down a research effort into as many publishable parts as possible, and publishing essentially the same thing more than once.
- Getting yourself included as a co-author on as many submissions as possible, regardless of the nature of your contribution, is highly desirable. This strategy seems virtually out of control.
- Because it is apparently in the best interests of journals to publish only positive results, in the form of statistically significant findings, it is in the best interests of individual contributors to use the NHST model, and perhaps a variety of QRAPs, to increase the frequency and magnitude of positive (i.e. statistically significant) results. It is well documented that the frequency of such strategies is much too large. There is publication bias. This serves to mis-represent and/or mis-estimate true effect sizes.
- It is also in the best interests of editors and researchers to *not* formulate research questions for which knowing that there are no effects is just as important as knowing that there are. Nil results are virtually never published, no matter how important and informative they are.
- Replications are not seen as contributing to higher citation counts or increases in impact factors. Therefore do not submit, or accept, replications of previous findings. Unfortunately, this virtually dooms a science to no progress. We are dependent on replication, in its many forms, as discussed previously.

- Sometimes the research on important substantive issues is difficult and time-consuming, but the eventual payoff could be quite large. However, pursuing such issues does not yield high publication rates and high citation counts. It is rational for the individual researcher to avoid them. If all researchers act this way, progress will virtually halt.

Yes, it is difficult and time-consuming to do performance evaluations of theorists, researchers, and editors that assess their actual substantive contributions to the first four goals. Counting publications and citations is so much easier. However, there is no evidence that such counts actually reflect substantive performance itself, especially given the degree to which they are gamed. The correlation between the two may be quite low, although it is probably not zero, or negative. The almost exclusive reliance on big data as an indicator of performance is doing great harm to IWOP and related fields.

A WAY FORWARD?

At the risk of sounding like do-gooders who are so above the dark side, we think IWOP and related fields must at least try to do the following. Our suggestions are summarized in Table 1.3.

- Devalue Theory for Theory's Sake (TFTS). Better still, get rid of it. It seems to have very few contributions to make to Goals One, Two, Three, or Four. It devalues empirical research and suppresses replication. It suppresses knowledge accumulation. It fosters null hypothesis significance testing (NHST), and questionable research and analysis practices. It has negative utility for scientific advancement and for application. It suppresses innovation. The *Academy of Management Review*, and the *Organizational Psychology Review*, among others, should rethink their missions.
- The mastheads of the *Journal of Applied Psychology*, *Personnel Psychology*, and the *Academy of Management Journal*, and their consequent editorial and review policies, should be changed. Making a 'theoretical' contribution should *not* be *required* as a condition for accepting, or even reviewing, a submitted manuscript. The emphasis should be on the

Table 1.3 Strategies to counter the effects of TFTS and the Fifth Goal, and move IWOP toward a more productive pursuit of Goals One, Two, Three, and Four

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1. Get rid of any incentive to produce Theory for Theory's Sake (TFTS). Change the mission statements of our major journals accordingly.
 2. Change journal policies and reward systems to encourage replication.
 3. No longer permit the use of null hypothesis significance testing (NHST) as an indicator of the significance of research results.
 4. Institutionalize a continual specification, and re-specification – with all the attendant messy arguments – of what our most critical substantive research issues and questions are.
 5. Devalue number of publication and citation counts as indicators of substantive individual performance contributions. Difficult though it is, use actual assessments of substantive worth to reward theorists, researchers, and practitioners.
-

empirical questions or issues to be addressed. Yes, that means there should be a justification for why the question(s) and issue(s) are important, why they are framed the way they are, and what their implications are for one or more of the first four goals. However, these can be stated succinctly, in direct ungibberical language, with or without using the word theory. The length of many manuscripts could be cut by 40–50 percent, or more. It would make them more useful (e.g. see Highhouse, 2014; Park, 2009; Taylor, 2009).

- NHST should *never* be used. The critical empirical questions that are addressed should be framed such that the answers are important regardless of the magnitude of the effect size. That is, it is important to know whether the results are negative or positive (and by how much), or nil.
- Replication should be encouraged, demanded, and rewarded. This may require some drastic revision in journal and data archiving formats. So be it (e.g. see Nosek & Lakens, 2014; Simons, Holcombe, & Spellman, 2014; Tsuji et al., 2014).
- Instead of obsessing over new, novel, or gap filling theory we should obsess over the critical empirical questions that should be addressed, so as to maximize our contributions to Goals One, Two, Three, or Four, or some combination thereof. Research addressing such questions can be anywhere on the basic research to applied/action research continuum. As argued earlier, the generation, identification, elaboration, and discussion of our critical substantive issues should be an institutionalized, ongoing, never-ending conversation, using various formats such as professional task forces, professional/scientific society reports, conference presentations, journal special issues, edited

volumes, etc. Practitioners should be included. The conversation should be about critical, substantive, empirical issues, not about theory or methods. Again, one example is the special forum article by Cappelli and Keller (2013) on the determinants and implications of different kinds of employment contracts. Other examples concern the effects of social media on recruitment and selection (Roth, Bobko, Van Iddekinge, & Thatcher, 2016), and attempts to teach entrepreneurship performance in developing economies (Frese, Gielnik, & Mensmann, 2016). A broader example is the recent effort by Banks, Pollack, Bochantin, Kirkman, Whelpley, and O'Boyle (2016) to identify what both academic researchers and HRM practitioners believe to be the current, and future 'grand challenges' for IWOP, and management science research. In more mundane language, what should be our most important HRM research goals? Relevant opinions were gathered via interviews, focus groups, and surveys sent to 828 academics, and 939 'practitioners' (i.e. HR managers of various kinds). The combined information was content analyzed to identify the principal goals it represented. In terms of the grand challenges, eight were mentioned by both academics and practitioners, (e.g. reduce pay inequality, expand opportunities for continuing education and training), eight were from the academic side of the house (e.g. reduce the science–practice gap, optimize the assessment and development of innovative/creative people), and six were from practitioners (e.g. promote employee well-being, facilitate the measurement and development of communication in the workplace). Efforts like this, using different methods, venues, and perspectives, should be

a frequent and ongoing part of our existence. Our survival, as significant contributors to the first four goals, depends on it. The arguments by Morrell and Learmonth (2015) that such conversations would be encased in positivist, non-pluralistic, servants-of-power language and values, are specious and nihilistic. They themselves do not articulate *any* goals that can be addressed by systematic information gathering, even by ethnographic story telling (which is a useful method for many purposes, including the identification of critical research questions that can be addressed by programmatic research).

The negative influences of publication counts, citation counts, and JIF, in lieu of assessments of performance itself, have always been with us, but they are now the dominant basis for researcher, theorist, and journal editors' rewards. This trend simply must be reversed. Big data must at least be combined with assessments of performance itself (Campbell & Wiernik, 2015). Not to do this will severely degrade the impact of IWOP theory and research on Goals One, Two, Three, and Four. We believe that it already has.

A FINAL WORD

We titled this chapter, 'The Functioning of Theory in IWOP'. A more elaborate statement would be 'the functioning of theory in pursuit of the four goals addressed by research and practice in IWOP'. Our overall conclusion is that most 'theory' in our literature functions as TFTS. It is dysfunctional for the first four goals, and the dysfunction is getting worse. These negative effects are not uniform across the various sectors under the IWOP label, but all sectors are under stress for the reasons elaborated above. Our field paid no heed to Hambrick's (2007) warnings. Things must change, or we will pay an ever increasing price. We have tried to offer a way forward, but it will be effortful and difficult. The stakes are high, but the rewards would be well worth it.

ACKNOWLEDGMENT

We wish to thank Marissa Clark, many times over, for facilitating the production of this chapter with great expertise.

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Ethical Issues and Standards in Research and Applications of Industrial, Work and Organizational Psychology

Rodney L. Lowman

INTRODUCTION

‘What is a profession?’ is a question Joel Lefkowitz discusses at some length in his important book on *Ethics and Values in Industrial-Organizational Psychology* (Lefkowitz, 2017, p. 253). Like others before him, he concludes that a profession entails, among other defining characteristics, mastery over many years of a body of complex knowledge, the privilege of the profession to largely self-regulate, a lifelong commitment by its members to their profession, and (among other characteristics) ‘some form of ethical code as a guide to appropriate action regarding clients, colleagues, and the public at large’ (p. 256). This chapter addresses ethical issues involved in the practice of Industrial-Organizational (I-O) and work psychology as well as the plethora of guidelines, laws, court cases, and articulated principles that govern the profession, particularly in the area of personnel psychology.

PERSONAL HISTORY

Concern with ethical issues in the practice of I-O and consulting psychology has been part of my career for over 35 years. While serving as Chair of

the Professional Affairs Committee (as it was then called) of the Society for Industrial-Organizational Psychology (SIOP) not long after graduating with a PhD from Michigan State University I spearheaded the effort to develop the first ethics casebook in I-O psychology (Lowman, 1985). It was at the time a bit of a struggle to get the project approved but ultimately SIOP’s Executive Committee agreed to publish the casebook. In tiny type in what seemed more like a long pamphlet than a book, a copy was distributed to each member and student member of SIOP. (Since then the casebook has become a staple of the field and is jointly published by SIOP and American Psychological Association (APA) as a book; see, e.g., Lowman, 2006.)

In contrast, as it happened, I was also interested in, and pursued training along with I-O psychology, in clinical psychology including an APA-approved internship and post-doctoral training. In that area of psychology the attitude and approach to regulations – standards – was quite different from what I had encountered in the I-O side of my training. APA accreditation of training programs brought with it a number of issues of control, standards setting, and the mandate to cover certain areas in training programs. This was just the type of ‘regulation’ that SIOP seemed actively to resist, functioning as it did in the ‘real world’ of

business organizations which, in that era (if not now) aggressively resisted any kind of regulation.

Despite what I will characterize as its ambivalence to oversight and regulation, Industrial, Work, and Organizational psychology (hereafter, IWOP), at least in the US, works within some major regulatory parameters including legal issues in its practice. Heavily regulated both by law and court case precedents (and the threat of legal action) is the practice of the 'I' or personnel side of OP. That domain, as I will discuss in this chapter, in the US and in many Western countries is fraught with regulations, guidelines, and court cases with the force of law that directly influence practice. These include laws like the Age Discrimination in Employment Act of 1967, the Americans with Disabilities Act of 1990, the Civil Rights Act of 1964, the Equal Pay Act of 1963, the Vocational Rehabilitation Act of 1973, state and local laws affecting personnel hiring and termination, and enough precedent-setting and emerging court cases to keep busy a number of attorneys (see, e.g., Gutman, Outtz, & Dunleavy, 2017). Indeed, IWO psychologists in the US and other countries (see Caligiuri & Paul, 2017) in their professional practices are awash in regulation and have the duty to try to assure that their work, and the actions of their client organizations, in selection, promotion, and advancement are done within the parameters of law and are defensible. Additionally, most modern corporations of any size are international in focus, raising the issue of needing to assure compliance with an assortment of other laws and regulations, including those that may be inconsistent with those in the US (see, e.g., Shen, Sackett, Lievens, et al. 2017).

Additionally, all I-O psychologists who use or develop assessments are bound by technical standards that govern the practice of the development and psychological tests. For example, the *Standards for Educational and Psychological Testing* (American Educational Research Association [AERA], APA, and National Council on Measurement in Education [NCME], 2014, is a comprehensive compendium of technical standards governing this area of practice. Additionally, psychologists may have guidelines or standards from their professional societies (see SIOP's Principles for the Validation and use of Personnel Selection Procedures (2003; currently under revision, see www.siop.org) and those specific to political jurisdictions such as, in the US, the Uniform Guidelines on Employee Selection Procedures (CFR60-3; nd; see also Farr and Tippins, 2017).

A single chapter therefore cannot do much more than to introduce the topic of ethics, standards, and guidelines that affect the practice of IWOP as they relate to practice in even a single country. In this chapter I will therefore discuss only highlights of

some of the ethical, legal, and other parameters governing the practice of psychology in general and organizational psychology (OP) in particular.

ETHICAL PARAMETERS AND GUIDELINES

Although I have written widely on OP ethical issues (see, e.g., Lefkowitz & Lowman, 2017; Lowman, 2013-a, 2013-c; Lowman, 2014; Lowman & Cooper, 2018) throughout my career and have probably trained as many IWO and consulting psychologists and graduate students in ethics as anyone, the truth is that I stumbled on to these issues rather accidentally. On the OP side of my graduate school training at one of the premier I-O psychology graduate school training programs, I don't recall ever having been asked to read a single article on ethics, including the ethics code governing OP. Of course there was a lot less to be known then about ethical and legal issues in the practice of OP but that also was not an area of much emphasis and the lore then was that the ethics code of the APA referred more to clinical and mental health issues than to those of OP. It was therefore somewhat accidental – a collision of circumstances, opportunities, and interests – that propelled me into this neglected area. I wish I could say that 35 years later ethical issues were a standard part of the IWOP curricula but I do not find much evidence that that is the case. Judging from what graduates from various programs around the world tell me, it is not clear that much of the IWOP curricula is devoted to issues of professional practice, much less than to ethical concerns. So here I will start with some basic parameters and then aim to bring things up to date with what is in the literature, if not always in the curricula.

IWOP AS A PROFESSION

Is IWOP a profession? Despite the fact that the field cannot seem to agree on a single name by which to be called, raising issues of consistency of training and curricula of what is offered under the various rubrics, by any reasonable definition of that term (e.g., Haber, 1991) the answer would appear to be 'yes'. Beyond the characteristics noted at the beginning of the chapter, for there to be a profession there must be a field of knowledge or practice that encompasses a complex corpus of knowledge requiring years of study to master. The field must be self-disciplining of its members, evaluate the fitness of candidates to enter the field,

and to have and enforce a code of ethics for its members and a mechanism by which complaints of improper conduct are evaluated and acted upon. For most professions there is also a government or professional association credential (usually, a license) issued to those who are allowed to practice in the area and those without the credential or license are not allowed to enter the field of practice. Examples of professions include: medicine, law, nursing, and accounting.

As for IWOP, it encompasses a strong and growing body of knowledge (one need only peruse the flagship journals, such as the *Journal of Applied Psychology*, to confirm this), it requires extensive post-bachelor's study to minimally master the field, and (to some degree) supervised experience of practice. It aims to govern itself (to the extent it wishes to be governed), and it lays strong and, I believe, unquestionably legitimate claim to its discipline being scientifically derived and much of its practice being science-based. The US professional association for I-O psychologists (as they are still called by that group), SIOP, officially embrace a code of ethics (that of the American Psychological Association) and although it does not normally enforce its ethics standards itself, it refers ethical complaints that rise to a certain threshold to the APA for those of its members who are also members of APA. (That said, not all of SIOP's members are covered by the APA code in any enforceable way since a number of SIOP members are not also members of the APA.)

At the same time, SIOP as an organization is not unambivalent about professional regulation. Although it articulates a set of competencies (SIOP, 1999; note that a draft version is currently in draft form; see SIOP, 2017) in its *Guidelines for Education and Training at the Doctoral Level in Industrial-Organizational Psychology*, it is quick to delimit the impact of these guidelines in stating:

The term 'guidelines' refers to pronouncements, statements, or declarations that are suggestions or recommendations. Guidelines differ from 'standards' in the 'standards' may be mandatory and may be accompanied by an enforcement mechanism. Thus, as guidelines, this document is not intended to be either mandatory or exhaustive or a substitute for appropriate professional judgment and it may not always be applicable in all situations. The aspirational intent of the guidelines is to facilitate the continued development of Industrial/Organizational Psychology.

Professions are characterized by attributes that distinguish them from other occupations (Haber, 1991) including obligations both to clients served and to the larger society. In turn, professionals

enjoy a considerable amount of autonomy, influence, and respect.

When it comes to the expectations of a profession that it be self-governing by defining and enforcing standards of ethical behavior, however, OP is less illustrative of what is expected of a profession. It is rare, for example, to find in the curricula of OP graduate training programs, courses in ethics. Lefkowitz (2017), for example, in reviewing introductory text books in I-O psychology found very few references to ethics. Additionally, SIOP appears not to have taken a robust approach to addressing behavior that raises ethical issues. Since most I-O psychologists in the US are not licensed, it is now clear where ethical code enforcement is expected to take place especially for the members of SIOP who are not also members of the APA, which does have a robust ethics enforcement process.

THE ETHICS OF ORGANIZATIONAL PSYCHOLOGY

In this section, therefore, I will discuss issues about the ethical parameters that govern the practice of OP and illustrate their complexity with case material.

The first question is what ethics code applies to the practice of I-O psychology. This is a surprisingly complex question. For now at least, SIOP is a division of the American Psychological Association as well as being a separately incorporated entity. The 'official' ethics code of SIOP is that of the APA. Its bylaws state:

(the Society) encourage[] its members to uphold the provisions of the American Psychological Association's Ethical Principles of Psychologists and Code of Conduct, which have been adopted as the ethical code of the Society; (Bylaw A2.h, SIOP, 2017 p. A-1)

Encourages seems a rather weak statement about ethical compliance expected of a professional association's members. To elaborate, SIOP currently has members who are in the APA, the Association for Psychological Science, and in other professional organizations (or in none).

A Society Fellow, Society Member, or Society Associate may be dropped from membership for conduct which tends to injure the Society, or to affect adversely its reputation, or which is contrary to or destructive of its purpose, or on the basis of violations of the Society's ethics code. Investigations

and taking of actions will be governed by rules and procedures established by the Executive Board. (SIOP, 2017a, p. A3)

SIOP's Bylaws now provide a basis for adjudication of alleged violations of their adopted ethics code. They state:

IWOP psychologists not residing in the US, not members of SIOP or the APA, may be ethically governed by other codes of behavior relevant to their country. However, with a few exceptions, there are more similarities than dissimilarities in the psychology ethics codes around the world (see, e.g., Gauthier, Pettifor, & Ferrero, 2010; Lowman, 2013-a). Most of the codes identify a majority of the same issues (e.g., confidentiality, informed consent, multiple relations, integrity, etc.) even if adjudication methods may differ across jurisdictions. Here, therefore, I will focus less on the formal review and resolution of complaints about unethical behavior than on how ethical standards apply to the practice of IWO psychology and, for space limitations, among others, I will use the APA Ethics Code (APA, 2017) as the frame of reference while recognizing that it does not apply in all jurisdictions. Most likely, standards equivalent to the ones cited can be found in the codes of ethics of other psychological associations around the world.

A SAMPLER OF IWOP ETHICS CASES

It has been my experience that people learn ethical standards and principles and how to think ethically most effectively by working with case material. In this section of the chapter I will therefore introduce some representative cases.

Over the last 30 years, often with colleagues, I have conducted a number of ethics workshops with professional psychologists on the topic of ethical practice in I-O and consulting psychology. The participants have mostly been I-O or consulting psychologists who are practitioners (typically needing the ethics Continuing Education (CE) credits for their psychology licenses), advanced graduate students, or academics with small part-time consulting practices. In almost all such trainings, participants are asked before the workshops to submit a case from their actual experience or one of theoretical interest.

The case material in this chapter largely derives from aggregations of some of these cases. In no instance is any actual case material used. Rather, these cases are consolidations of case

material across many different examples received over the years that illustrate the types of cases typically encountered. (I would add that there is rarely difficulty in assembling an assortment of cases for discussion; even if such cases may not often formally be adjudicated they are seemingly commonly experienced by practicing I-O psychologists.)

ETHICS CASE 1: WHEN IS PSYCHOLOGICAL INFORMATION CONFIDENTIAL?

Facts of the Case

A psychologist-coach employed as an internal consultant for a large corporation reported to the company's Vice President for Human Resources. He was coaching a senior executive who had been promoted to an influential position in the organization four months previously. Fairly successful in her prior positions, the executive coachee had experienced a bit of a rocky road in her present position, which was at a higher level than her last one and which reported directly to the CEO of the company. The executive being coached was told when the coaching began that the service, paid for by the company, would be for purposes of helping her address work performance and development issues and would be kept confidential unless otherwise agreed.

After a meeting attended by the CEO, the executive being coached, the VP for HR, and the psychologist-coach, the CEO asked the psychologist to stay behind. After a few pleasantries he asked bluntly, 'So, is [the executive being coached] going to make it?'. The psychologist-coach, while not directly answering the CEO's question, provided an update on the coaching, noting that the client was faithfully attending the sessions but did not feel very supported in her current role, and felt that her racial status (the only ethnic minority in the C-suite) was getting in the way of her being successful. The CEO asked what he and others working with her could do to help her be more successful and the psychologist-coach gave several suggestions.

Ethical Questions

The major question this case raises is whether the IWO psychologist-coach had an ethical obligation not to respond to the CEO's request for information without the specific consent of the client.

Secondary questions include: was the coach acting in the role of a psychologist when conducting coaching and who was the client?

Relevant Ethical Standards

As noted, I am using the APA code of ethics as the standard in this chapter. To apply other codes of ethics, readers can consult the relevant codes of ethics and standards for their jurisdictions. All references to the APA code are from APA (2017, unpaginated).

APA Ethics Standard 3.11 Psychological Services Delivered to or Through Organizations

(a) Psychologists delivering services to or through organizations provide information beforehand to clients and when appropriate those directly affected by the services about (1) the nature and objectives of the services, (2) the intended recipients, (3) which of the individuals are clients, (4) the relationship the psychologist will have with each person and the organization, (5) the probable uses of services provided and information obtained, (6) who will have access to the information, and (7) limits of confidentiality. As soon as feasible, they provide information about the results and conclusions of such services to appropriate persons.

(b) If psychologists will be precluded by law or by organizational roles from providing such information to particular individuals or groups, they so inform those individuals or groups at the outset of the service.

APA Ethics Standard 4.01 Maintaining Confidentiality

Psychologists have a primary obligation and take reasonable precautions to protect confidential information obtained through or stored in any medium, recognizing that the extent and limits of confidentiality may be regulated by law or established by institutional rules or professional or scientific relationship. (See also Standard 2.05, Delegation of Work to Others.)

APA Ethics Standard 4.02 Discussing the Limits of Confidentiality.

(a) Psychologists discuss with persons (including, to the extent feasible, persons who are legally incapable of giving informed consent and their

legal representatives) and organizations with whom they establish a scientific or professional relationship (1) the relevant limits of confidentiality and (2) the foreseeable uses of the information generated through their psychological activities. (See also Standard 3.10, Informed Consent.)

(b) Unless it is not feasible or is contraindicated, the discussion of confidentiality occurs at the outset of the relationship and thereafter as new circumstances may warrant. (APA, 2017, unpaginated)

Discussion

APA Ethics Standard 3.11 was added to the 2002 version of the Code for the benefit of I-O and consulting psychologists and in many ways covers most aspects of this case. Assuming that the psychologist-coach were functioning as a psychologist in performing the coaching services, the psychologist had an ethical obligation to make clear at the outset of the intervention the responsibilities he had to the various parties involved in the consultation and any limits of confidentiality. Because the coaching was of someone with a known performance issue (not coaching done just for purposes of development) it should have been expected that there would be the need to gather information from many sources such as in 360-degree feedback and the like, and to understand the perspectives of those with whom she worked. As it was, the psychologist made an assurance of confidentiality and that the client's consent would be obtained for any exceptions to those terms.

Psychologists working in corporations exist in hierarchical organizations where considerable power, including the power to fire, resides in high-level management positions. Pressure to comply with requests from senior leaders an organization can be significant but, when functioning as a psychologist, the ethical standards still apply. The obligation of the psychologist in this case was to make known the agreement that had been reached by the psychologist and explain why information shared in confidence could not be provided to the CEO. Additionally, the psychologist was being asked to make a professional judgment about the likelihood the client would succeed. This would in the best of circumstances be a difficult conclusion to draw especially since part of the answer to the question depends on how the client's superiors and peers reacted to her and where they supported her. Thus, the psychologist might have explained the terms of the professional engagement with the client and asked the CEO for his perceptions about

the client, and possibly suggested that a facilitated meeting between the two and the psychologist might help to clarify expectations and objectives. (This would require the uncoerced approval of the client, however.)

A more complicated question is whether the psychologist was functioning as a psychologist at the time of the coaching. Although coaching is included among the core competencies in the SIOP training standards (SIOP, 2016), persons without training in I-O or consulting psychology also perform coaching. Indeed, there are a number of professional associations that represent the field of coaching including the International Coaching Federation. The somewhat distinctive aspect of the work of IWO psychologists is that, as internal consultants, coaches, and employees, they may be functioning less as psychologists than as persons in roles that could be done by others with different training and professional backgrounds. To the extent that a psychologist assumes, say, a managerial role that may draw on the training in psychology but would not consist of the practice of psychology, arguably, the ethics code would not apply to this behavior (see Lowman & Cooper, 2018). The APA Code specifically states: 'This Ethics Code applies only to psychologists' activities that are part of their scientific, educational, or professional roles as psychologists' (APA, 2017, Introduction and Applicability). On the other hand, the Code goes on to say, in the following sentence,

Areas covered include but are not limited to the clinical, counseling, and school practice of psychology; research; teaching; supervision of trainees; public service; policy development; social intervention; development of assessment instruments; conducting assessments; educational counseling; organizational consulting; forensic activities; program design and evaluation; and administration.

Of course this dilemma is not unique to IWO psychologists. Psychologists can also be trained and licensed as nurses or medical doctors. What is important in each case is that they make clear the role they are in when performing services so as not to confuse the client and so that, if relevant, the client knows the applicable ethical issues or venue for filing complaints. Additionally, the specific role being played needs to be made clear at the outset of the delivery of services. A psychologist, for example, who is functioning as an employee of the organization with fiduciary responsibilities to that entity might have to say something to the effect of 'Although I am a trained psychologist, in my work here at XYZ Corporation, I am employed by the company and here are the

assumptions I need to make in that role concerning my work with you'.

As important an issue for psychologists to consider are the values that they wish to embrace in their work. There is nothing that says one who trained as a psychologist must forever be one. A psychologist may become a manager, say, and no longer have the self-identity as a psychologist. But in general those who went to the trouble of getting a doctoral degree in an IWOP area probably do not want to leave either the identity or knowledge base behind. The training presumably was to become a professional and all that that embraces. In many cases in working, in applied settings, that identity, and the expectations of adhering to an ethics code, are deeply rooted. The ethical expectations of psychologists are, in any case, useful in thinking through conflicts and issues at work, in protecting the various constituencies, and in doing high-quality work.

ETHICS CASE 2: WHEN IS CONSENT REQUIRED FOR ASSESSMENTS?

Facts of the Case

A candidate for an executive position in a large corporation was sent by the company to a practicing psychologist and participated in a two-day assessment center process. The candidate was not chosen for the position for reasons she attributed to the assessment since she felt she had otherwise been fast-tracked for the position. She therefore asked for feedback from the psychologist on how she had done in the assessment. The psychologist stated that the company did not allow sharing of the results of the assessment and therefore no feedback could be provided. The client subsequently filed an ethics complaint against the psychologist on the basis of feeling he was ethically obligated to have provided this information.

Ethical Questions

Are IWOP psychologists required to obtain informed consent elaborating the terms of assessment before conducting psychological evaluation candidates in the context of work positions? If feedback is not included as a standard part of the assessment process must that information be shared with clients at the outset of the assessment? Who pays for the psychologist's time when providing feedback to assessed clients?

Relevant Ethical Standards

APA Ethics Standard 3.10 Informed Consent

(a) When psychologists conduct research or provide assessment, therapy, counseling, or consulting services in person or via electronic transmission or other forms of communication, they obtain the informed consent of the individual or individuals using language that is reasonably understandable to that person or persons except when conducting such activities without consent is mandated by law or governmental regulation or as otherwise provided in this Ethics Code. (See also Standards 8.02, Informed Consent to Research; 9.03, Informed Consent in Assessments; and 10.01, Informed Consent to Therapy.)

APA Ethics Standard 3.11 Psychological Services Delivered to or Through Organizations

(a) Psychologists delivering services to or through organizations provide information beforehand to clients and when appropriate those directly affected by the services about (1) the nature and objectives of the services, (2) the intended recipients, (3) which of the individuals are clients, (4) the relationship the psychologist will have with each person and the organization, (5) the probable uses of services provided and information obtained, (6) who will have access to the information, and (7) limits of confidentiality. As soon as feasible, they provide information about the results and conclusions of such services to appropriate persons.

(b) If psychologists will be precluded by law or by organizational roles from providing such information to particular individuals or groups, they so inform those individuals or groups at the outset of the service. (APA, 2017, unpaginated)

APA Ethics Standard 9.03 Informed Consent in Assessments

(a) Psychologists obtain informed consent for assessments, evaluations, or diagnostic services, as described in Standard 3.10, Informed Consent, except when (1) testing is mandated by law or governmental regulations; (2) informed consent is implied because testing is conducted as a routine educational, institutional, or organizational activity (e.g., when participants voluntarily agree to assessment when applying for a job); or (3) one purpose of the testing is to evaluate decisional capacity. Informed consent includes an explanation of

nature and purpose of the assessment, fees, involvement of third parties, and limits of confidentiality and sufficient opportunity for the client/patient to ask questions and receive answers. (APA, 2017, unpaginated)

Discussion

The questions involved in this case are more complex than might be imagined. From the perspective of the APA Ethics Code the answer to the question about whether informed consent is required, which includes for persons undergoing assessment for purposes of selection, is ‘it depends’. For most psychological services, informed consent is required by the Code. According to Ethics Standard 3.11 this requires identifying which of those being dealt with are clients and who will have access to information obtained in the course of the psychological work. On the other hand, APA Ethics Standard 9.03(a)(2) specifies that informed consent is not required when it is implied ‘because testing is conducted as a routine educational, institutional, or organizational activity (e.g., when participants voluntarily agree to assessment when applying for a job)’.

There are other complicating ethical factors. A corporate client might well decline to finance the costs of providing feedback to unsuccessful candidates. On the other hand, the scientific evidence (see, e.g., London & MacFarland, 2010) suggests that assessees are more likely to be supportive of the process when they are provided feedback. Additionally, feedback to successful candidates may help them understand areas of strengths or weaknesses and possibly to do better on the job (see Gregory & Levy, 2015).

Ethical Standard 3.11 is a good starting point for addressing many issues in IWO psychology practice. In this case, it would be possible not to provide feedback but the psychologist would have a better case for doing so had s/he made that clear to all respondents at the outset. It might be argued that, for an applicant completing an assessment in the context of a mass screening of hundreds of applicants, as with 9.03(a), consent was implied by the employment selection context. After all, the candidate could have chosen not to participate in the job candidacy for this particular position.

On the other hand, a 2-day assessment for an executive position is arguably more complex. Not to explain what would happen to the assessee during this extensive process, not to explain how the assessment would fit in to the selection process, and not to provide feedback on the results of the assessment would seem ethically inappropriate for a number of reasons. From the scientific

perspective, better cooperation would be obtained with full disclosure up front. Second, to the extent the organization requesting the assessment is the client there is an ethical obligation to use best practices and not to put the client at risk. To the extent, as in this case, an unsuccessful assessee may be more likely to be litigious, the client should at least be aware of that possibility. Finally, there is the public relations angle of putting people through extensive assessments and then refusing, when requested by assessees, to provide feedback, creating potential ill will toward the client organization and to psychological assessment in general.

ETHICS CASE 3: SOCIAL ISSUES

Facts of the Case

This case involves an IWO psychologist working for a non-unionized company with a poor reputation for social responsibility and environmental standards. The company's business was in the energy industry and it persistently skirted safety provisions and was perceived by environmentalists as 'raping' the environment, pulling out of a site after exploiting the resources. The company paid wages regarded as good in the impoverished areas in which it mostly operated but the benefits were limited, particularly in health care and retirement benefits, and the company had a high rate of layoffs. Those employees who tried to organize employees or to suggest that the company address environmental issues did not last long in the organization.

Ethical Questions

Do IWO psychologists have an ethical obligation to address social issues as they relate to their area of practice? Should IWO psychologists decline to work in, or quit, such organizations? How can they express concerns without losing their positions?

Relevant Ethical Standards

Principle A: Beneficence and Nonmaleficence

Psychologists strive to benefit those with whom they work and take care to do no harm. In their professional actions, psychologists seek to safeguard the welfare and rights of those with whom they interact professionally and other affected persons, and the welfare of animal subjects of research. When conflicts occur among psychologists' obligations or concerns, they attempt to

resolve these conflicts in a responsible fashion that avoids or minimizes harm. Because psychologists' scientific and professional judgments and actions may affect the lives of others, they are alert to and guard against personal, financial, social, organizational, or political factors that might lead to misuse of their influence. Psychologists strive to be aware of the possible effect of their own physical and mental health on their ability to help those with whom they work. (APA, 2017, unpaginated)

APA Ethics Standard 3.04 Avoiding Harm

(a) Psychologists take reasonable steps to avoid harming their clients/patients, students, supervisees, research participants, organizational clients, and others with whom they work, and to minimize harm where it is foreseeable and unavoidable. (APA, 2017, unpaginated)

Discussion

Elsewhere (Lowman, 2013c, 2014) I have written that the APA Ethics Code has to be stretched pretty far to find an ethical requirement of advocacy for issues of social justice or sustainability. The APA principles, unlike the standards, are not per se enforceable, though psychologists are advised to take them into account in thinking through ethical issues. In any case, Principle A, and its operationalized, enforceable standard, 3.04, refers mostly to psychologists avoiding doing harm to their clients in their own professional work, not keeping others from doing harm. And it would have to be argued that in 'avoiding harm' psychologists had a duty to protect the environment or push for social justice. Even at its most expansive, e.g., 'Psychologists are committed to increasing scientific and professional knowledge of behavior and people's understanding of themselves and others and to the use of such knowledge to improve the condition of individuals, organizations, and society' (APA, 2017, Preamble), this does not take IWO psychologists very easily to specific obligations to address societal concerns such as environmental ones.

In my own reviews of psychologists' ethics codes around the world I have only found one psychologists' ethics code, that of the Canadian Psychological Association (CPA), that is explicit about psychologists' duties in the larger social context. The CPA's ethics code's articulates in its Values statement to Principle IV: Responsibility to Society:

Psychologists, both in their work and as private citizens, have responsibilities to the societies in which they live and work, such as the neighbourhood or

city, and to the welfare of all human beings in those societies. Two of the legitimate expectations of psychology as a science and a profession are that it will increase knowledge and that it will conduct its affairs in such ways that it will promote the welfare of all human beings ... (CPA, 2017, p. 31)

On the other hand, if structures or policies seriously ignore or oppose the principles of respect for the dignity of persons and peoples, responsible caring, integrity in relationships, or responsibility to society, psychologists involved have a responsibility to speak out in a manner consistent with the principles of this Code, and advocate for appropriate change to occur as quickly as possible. (CPA, 2017, p. 31)

The CPA code also includes a 'Responsibility to Society' section (CPA, 2017, pp. 31–35) section which includes an enforceable standard 'IV.29 Encourage others, in a manner consistent with this Code, to exercise responsibility to society' (CPA, 2017, p. 35).

If it is difficult to argue that there is currently an APA-mandated ethical obligation for IWOP psychologists in such settings to speak up on social justice and sustainability issues (see Lowman, 2013c), there are still reasons to do so. This identifies one of Lefkowitz's (2017) concerns with relying on ethics codes as the primary basis for making ethical decisions. Among other reasons, few codes of ethics for psychologists (the CPA code being an exception) specify what to do when ethical standards or principles are in conflict and must be prioritized. Lefkowitz suggested a series of five principles to consider including Fairness and Justice. He stated: 'This dimension is informed primarily by ethical theories based on the social contract and by political, sociological, and psychological concepts' (p. 389). He goes on to state: 'Business is a moral enterprise ... the consequences of business activity are very much within the domain of moral action ... Its ultimate justification is the utilitarian one of maximizing the aggregate good' (p. 499) and argues that it should be 'accountable, ethical and humane'. In a series of guidelines for ethical problem identification, Lefkowitz suggests that IWO psychologists need to

Decide whether the problem is an ethical one ... Do you have a sense that this is more than just a technical problem ...? An ethical problem will generally invoke one or more principles from 'The Domain of Moral Action.' It may entail the threatened disrespect of some people (or a person), such as by violating their rights to privacy or autonomy or failing to honor an obligation to them; the potential imposition of unjustified ill effects on some or the distribution of undeserved rewards to others; a temptation to refrain from affording benefit or care to another than one ought to provide; contemplation of the infliction of harm (or of

failing to prevent it), especially on those who possess lower social status, fewer resources or less power; or a violation of the moral virtues concerning truthfulness, fidelity, trust, and so on—especially to those with whom we have a fiduciary relationship. (Lefkowitz, 2017, 505–506)

The challenge here is that the actions may not be in the direct control, knowledge or, perhaps, direct expertise of the psychologist.

Perhaps the most compelling ethical case to be made of IWO psychologists having a moral obligation to act in circumstances such as those in this case is that the concerns at issue are inherently ethical ones, the impact on the organization's stakeholders and to the broader society are potentially profound, and the consequences of the company's behavior harmful not only to those who voluntarily chose to put themselves in that context but also to the society as a whole. At the systemic level, if our world does not reverse course on sustainability issues, the issues related to the practice of psychology may be pretty tangential and irrelevant to much of anything. Second, psychologists are often some of the only professionals with the knowledge, power, courage, and autonomy to influence the values of organizations. Psychologists as a professional group are morally driven. As members of a profession given by society rights and obligations to be some of the caretakers of the greater good, they are well-positioned to help articulate why it may be in the best interests of the organization to attend to its behavior and its impact on the local and broader environment (there is also an empirical literature to support the intersect of doing good and positive organizational outcomes; see, e.g., SIOP, 1999). IWO psychologists do not of course have to promote societal issues in a way that is strident or excessive or that will not be able to be heard by others, but over time they can potentially help to influence the moral dialogue (or lack thereof). They also usually have the option to leave the organization if it crosses a line in terms of its destructive or unethical behavior.

IMPLICATIONS FOR ETHICAL PRACTICE

As these cases illustrate, the ethical practice of IWOP is often complex. The simple issues (such as not lying, cheating, stealing, misrepresenting data or scientific findings) may be straightforward and obvious that IWO psychology psychologists whose training did not delve into ethical issues in detail might wonder what the fuss is about. However, those who have worked in the real world

of practice know that conflicts are inevitable, compromises to psychologists' ethics often needed, and there are few in managerial positions who are bound by a professional ethics code of their own or who know or care about the ethics code of a small number of professional employees. IWO psychology psychologists who take seriously their ethical responsibilities as psychologists must understand what their codes of ethics prescribe and proscribe and be prepared to work through many difficult issues, educating others with whom they work about their obligations. As the APA Ethics Code states in Standard 1.03, *Conflicts Between Ethics and Organizational Demands*:

If the demands of an organization with which psychologists are affiliated or for whom they are working are in conflict with this Ethics Code, psychologists clarify the nature of the conflict, make known their commitment to the Ethics Code, and take reasonable steps to resolve the conflict consistent with the General Principles and Ethical Standards of the Ethics Code. Under no circumstances may this standard be used to justify or defend violating human rights (APA, 2017, unpaginated)

OTHER GUIDELINES FOR THE PRACTICE OF IWO PSYCHOLOGY

Professional ethics are general guidelines meant to apply across a number of situations and requiring the use of professional judgment. But in the case of IWO psychology there are also a number of other, more technical, standards and guidance that must be considered in professional practice.

Most of the legal concerns involving the practice of IWO psychology concern the 'I' side, i.e., personnel selection. Arguably, the US leads the way in having the most laws and court cases with which IWO psychologists need to be concerned when practicing in the area of personnel selection. Although this provides a number of opportunities for litigation of government agency action against organizational clients, the laws are generally well-intentioned and reflect the extensive concern in the US with protecting the rights of those historically disadvantaged and to try to assure a level playing field for applicants for employment or promotion. That significant disparities still exist after so many decades of applicable laws suggest that problems of disparity are complex and rooted in a diversity of areas of concern.

Standards for Educational and Psychological Testing

An exception to the universality issue is the guidelines provided by the *Standards for Educational and Psychological Testing* (AERA, APA, and NCME, 2014). This painstakingly developed guide to the development, validation, and use of psychological and educational tests is widely used not only in the US but all over the world as one of the definitive set of guidelines for psychologists and others involved in these areas. The *Standards* are meant to be authoritative and to address applications in a variety of contexts including work and organizational applications, schools, health and mental health, etc.

Here is an example of one of these standards:

Standard 3.15. Test developers and publishers who claim that a test can be used with examinees from specific subgroups are responsible for providing the necessary information to support appropriate test score interpretations for their intended uses for individuals from these subgroups. (AERA et al., 2014, p. 70)

The *Standards* generally include commentary about the meaning of each standard and how it applies to practice. The volume is an excellent guide to even complicated areas of practice and, even though that is not their purpose, the *Standards* are sometimes cited in court cases since it represents the collective thinking of the professions involved in test development and use. By and large it does an excellent job of addressing an assortment of types of problems in this area. However, there is no group that is established to enforce these standards so they remain primarily a guide to good practice.

Principles for the Validation and Use of Personnel Selection Procedures

A second set of guidelines that influence practice not just in the US but that were developed in that country and context, are the guidelines for test validation developed by SIOP, the *Principles for the Validation and Use of Personnel Selection Procedures* (SIOP, 2003). These guidelines, now in their fourth edition (the fifth edition now in draft form (www.siop.org) are expected to be approved in 2017), have as their purpose 'to specify established scientific findings and generally accepted professional practice in the field of personnel selection psychology in the choice, development, evaluation, and use of personnel selection procedures designed to measure constructs related to

work behavior with a focus on the accuracy of the inferences that underlie employment decisions' (SIOP, 2003, p. 1).

These standards are periodically updated and are meant to incorporate sound science into the validation process, not to create a politicized approach. They are useful to IWO psychologists regardless of their location because of their focus on the science rather than the political side of personnel selection.

COUNTRY-SPECIFIC GUIDELINES AND COURT CASES

There are many other guidelines that affect the practice of IWO psychology, particularly in the area of personnel selection. Many advanced countries have their own laws and regulations and relevant guidance that must be followed but there are also countries – many of them – that have few regulations about employment practices – or *de facto* have none since existing measures may not be enforced. In a recent teaching assignment in a developing country, for example, as I tried to introduce the concept of adverse impact, students were quick to let me know that there were no protected classes in the country and in any case the US categories in areas such as race were quite irrelevant to that country (and increasingly in the US, see Lowman, 2013-b). The job of each IWO psychologist working in countries other than the US is to become familiar with the applicable laws and rules affecting the practice of IWO psychology in those contexts. Shen (2017) Caligiuri and Paul (2017), and Tison, Pryor, Aamodt, & Dunleavy (2017) provide a good introduction to the complexity of working internationally from a legal perspective.

Uniform Guidelines on Employee Selection Procedures (UGESP)

Specific to the US, these procedures were published by the Equal Employment Opportunity Commission, Civil Service Commission, Department of Labor, and Department of Justice (1978). These remain in place nearly 40 years later despite the tremendous advances that have been made in the science and practice of personnel selection. McDaniel, Kepes, and Banks (2011) attacked these *Guidelines* vigorously if not exactly dispassionately. The reality is the *Guidelines* do need updating but there is probably insufficient political will or even possibility of agreement in a country like the US that has for

many years been sharply politically divided. Whether they need updating or not, EWO psychologists who work with US-clients must carefully consider the *Uniform Guidelines* if they wish to minimize risk to their organizational clients.

LEGAL ISSUES IN THE PRACTICE OF IWO PSYCHOLOGY

It is difficult – almost impossible – to address these issues adequately in the context of a short chapter that will likely be read by persons other than in the US. IWO psychologists must be familiar both with relevant laws pertaining to the geographic areas of specific practice and with the relevant court cases, at least those that become precedent-setting, that develop in the adjudication of specific cases. Again to take the US as an example, most IWO psychologists practicing personnel psychology would, at the least, need to be familiar with the following laws and connected cases.

- Equal Pay Act of 1963
- Title VII of the Civil Rights Act of 1964
- Age Discrimination in Employment Act (ADEA) of 1967
- Americans with Disabilities Act (ADA) of 1990
- State-specific laws affecting employment and which may set more rigorous standards than federal laws

The website of the Equal Employment Opportunity Commission (see, e.g., http://www.eeoc.gov/policy/docs/factemployment_procedures.html) contains useful information about these laws and some of the relevant court cases and complaints filed about them.

Gutman et al. (2017) provide good summaries of some of the court cases and their enforcement, and Shen et al. (2017) provide an overview of how some personnel issues are regulated in selected other countries. IWO psychologists working in personnel selection will need to move beyond the integrity of their research to also consider what is legally possible and appropriate to do.

CONCLUSION

The strong identity of IWO psychologists with the science of their discipline sometimes masks the realities of professional practice in the context of work organizations in which science may

sometimes not play much of a role. As it develops, the complexities of real-world scientific applications are as vast as those involved in conducting research that creates or affirms the underlying science. The difference is that in science and research the rules are well-defined (if increasingly violated; see, e.g., Eensersink, 2012; Wade & Broad, 1983). In the case of professional practice, compromise and negotiation along with long-term advocacy assume greater importance. Greater attention to training in the ethical challenges and dilemmas of practicing IWOP may be needed so that our graduates feel confident and well-prepared in practicing their trade ethically and in compliance with laws and guidelines.

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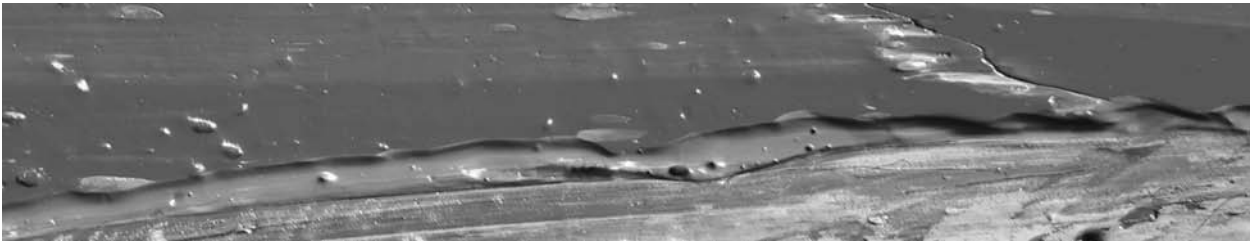
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PART II

Individual Behavior At Work



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Individual Job Performance

Michael B. Harari
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INTRODUCTION

Even a cursory review of the Industrial, Work, and Organizational (IWO) Psychology literature reveals that job performance is a centrally important construct. Indeed, job performance is widely studied in the IWO literature. Many interventions derived from IWO Psychology, such as selection and training, are intended to influence individual job performance (Aguinis & Kraiger, 2009; Schmidt & Hunter, 1998). Data pertaining to individual job performance are used for a variety of critical purposes in organizations, including administrative decision-making, providing developmental feedback, research (e.g., validation studies), and documentation (Aguinis, 2013; Cleveland, Murphy, & Williams, 1989; Murphy & Deckert, 2013). Individual job performance forms the basis for team and organizational performance (Campbell & Wiernik, 2015) and as such, most organizational interventions aim to influence individual job performance.

Given the central role played by job performance in IWO Psychology, understanding issues pertaining to the conceptualization and measurement of the construct is a key concern. The purpose of the present chapter is to review the vast literature on this important topic with a particular emphasis on developments that have occurred

post-2001 (when the last edition of this *Handbook* was published). We place particular emphasis on the following aspects of job performance: (a) dimensions of job performance and how they relate to one another, (b) advancements in measurement methods, (c) measurement issues, (d) causal models, and (e) demographic differences. For the purposes of the present chapter, we define job performance as evaluable behaviors engaged in by employees that contribute toward achieving organizational goals. Beyond this broad definition, what exactly is job performance?

THE CONSTRUCT OF JOB PERFORMANCE

Job performance is a latent construct and as such it cannot be directly observed. How is job performance manifested in organizations? To explicate the construct domain of job performance, research has used the following approaches: (1) rationally synthesizing dimensions found in job performance measures used in different contexts, (2) collecting data on hypothesized dimensions and testing the proposed factor structure using factor analysis, and (3) drawing upon organizational theories that specify what job performance should encompass. Based on these efforts, a wide number

of dimensional models of job performance have been proposed. A complete review of each model of job performance derived from each approach is beyond the scope of the present chapter and can be found in the prior version (Viswesvaran, 2001). Our focus in the current section is to review dimensions of job performance that have emerged more recently.

Viswesvaran and Ones (2000) proposed that dimensional models of job performance can be characterized according to whether they were developed as a stand alone dimension of job performance versus as part of a larger set of dimensions. Models of job performance can also be classified as either developed for specific occupations (e.g., managers) versus general models that are applicable across jobs. Crossing these two classifications results in four types of dimensional models of job performance: stand alone-specific, stand alone-general, larger set-specific, and larger set-general. Our review will not cover stand alone-specific dimensions of job performance. The dimensions encompassed in this category are too specific for the particular purposes of the present chapter in that each will only be applicable in a very narrow subset of jobs.

Of the remaining three categories, research in the past 15 years (2000–2015) has introduced several stand alone-general performance dimensions. These are specific performance dimensions that form part of overall job performance but are applicable across jobs. The past fifteen years have introduced performance dimensions like Counterproductive Work Behaviors (CWB), adaptability, creativity, etc. We review their conceptualizations and empirical evidence presented for them. In addition to reviewing these new performance dimensions (stand alone-across occupations), we also summarize (1) recent developments in stand alone-general performance dimensions reviewed in the last edition of the *Handbook* (e.g., task performance, Organizational Citizenship Behaviors), and (2) new synthesized frameworks of job performance models (Campbell, 2012).

New Stand Alone-General Dimensions

New research into stand alone dimensions of job performance that are applicable across jobs can be grouped into the following three dimensions: Creative and Innovative Performance (CIP), Counterproductive Work Behaviors (CWB), and Adaptability. Of these three dimensions, Campbell and Wiernik (2015) argue that it is difficult to

provide specifics of what the content of adaptability as a performance dimension is. Ployhart and Bliese (2006) also argue that it will be more profitable to identify what characterizes an adaptive individual than to consider adaptive performance as a distinct dimension of performance. Furthermore, adaptive performance overlaps both conceptually and empirically with CIP. We also found very little conceptual and empirical research on adaptive performance (cf. Pulakos, Arad, Donovan, & Plamondon, 2000). Thus, our review below will focus on CIP and CWB.

Creative and Innovative Performance (CIP)

Research has brought to light the importance of individual creativity and innovation for the success of modern organizations (Eisenhardt & Tabrizi, 1995; Gong, Zhou, & Chang, 2013). Indeed, developing or altering processes and procedures in such a manner that efficiency is increased and waste is reduced has the potential to improve the performance of virtually any organization (Zhou, 2008). The emergence of the knowledge economy also places a premium on creativity and innovation (Harari, Jain, & Joseph, 2014). This has led to research explicating CIP as a critical dimension of individual job performance with relevance across jobs (e.g., Oldham & Cummings, 1996). CIP speaks to creative and innovative behaviors engaged in by individuals or outcomes brought about by individuals. Specifically, creative performance refers to proficiency of idea generation, while innovative performance refers to proficiency of idea generation and subsequent implementation (Anderson, Potocnik, & Zhou, 2014; Hülsheger, Anderson, & Salgado, 2009).

Given the centrality of CIP as a dimension of an individual's job performance, several researchers have studied the antecedents and consequences of CIP (e.g., Pace & Brannick, 2010; Zhang & Bartol, 2010). CIP shares several antecedents such as cognitive ability with other performance dimensions (i.e., task performance). In fact, studies of CIP have reported substantial correlations between CIP and other performance dimensions. To explicate the nomological net of this performance dimension with other more established performance dimensions, Harari, Reaves, and Viswesvaran (2016) conducted a meta-analysis of the correlations between CIP, task performance, CWB, and Organizational Citizenship Behaviors (OCB). Cumulating data across 40 unique samples, Harari et al. (2016) found that CIP correlated highly with task performance and OCB (.55 and .56, respectively). However, the correlation with CWB was only .23 and it was negative. This is

surprising given that CIP and CWB both involve a violation of established norms and may be the result of how CWB was operationalized in the primary studies (more as withdrawal of effort and less of rule breaking). Overall, although the correlations were substantial suggesting the presence of a general factor across the different dimensions (cf. Viswesvaran, Schmidt, & Ones, 2005), the corrected correlations were also distinct from 1.0 suggesting CIP as an important and unique dimension of job performance. Job performance models need to include this dimension for a comprehensive coverage of the performance domain.

Counterproductive Work Behaviors (CWB)

Research on CWB has examined its dimensionality as well as its correlations with other established performance dimensions. Robinson and Bennett (1995) factor analyzed different counterproductive behaviors and suggested that the different behaviors can be grouped into two main dimensions. First, CWB can be behaviors directed toward the organization (theft, sabotage of equipment). Second, CWB could be directed toward individual members (undermining others, gossiping, etc.). This two-dimensional structure has been replicated in several studies and different organizational antecedents have been found for the two factors. Nevertheless, the correlation between them is substantial to support an underlying general factor. Furthermore, some researchers (e.g., Lee & Allen, 2002) failed to empirically distinguish between the two factors.

In addition to this two-dimensional classification, researchers (e.g., Spector, Bauer, & Fox, 2010; Spector, Fox, Penny, Bruursema, Goh, & Kessler, 2006) have argued for five facets of CWB and others have argued that CWB behaviors can be classified as being either an approach or an avoidance behavior (cf. Campbell & Wiernik, 2015 for a review). Gruys and Sackett (2003) in fact, based on multiple approaches (e.g., assessments of similarity, co-occurrences), postulate as many as eleven dimensions of CWB.

Despite the research on the multidimensionality of CWB, research has shown (cf. Ones & Dilchert, 2013) that a strong general factor of CWB emerges across the different CWB dimensions. This general factor has also been found in non-Western cultures; Peng He (2012) reports on the factor structure of CWB in Chinese samples and finds support for a general factor. Further, research has shown that CWB is correlated with OCB but is not simply the polar opposite of OCB (Berry, Ones, & Sackett, 2007; Miles, Borman, Spector, & Fox, 2002). As noted in the earlier discussion of

CIP, the CIP–CWB relationship is also low. Dalal (2005) meta-analyzed the relation between OCB and CWB. Dalal (2005) reports a negative correlation of .32 between CWB and OCB, an estimate similar to the CWB–CIP relationship (cf. Harari et al., 2016). Dalal (2005) also did not find the CWB–OCB relationship to be moderated by the target of CWB (individual or organization) but other moderating effects were found (e.g., source of ratings).

Empirical research has also sought to study the antecedents of CWB. Sackett and DeVore (2001), after reviewing the integrity test validity literature (cf. Ones, Viswesvaran, & Schmidt, 1993), argue that conscientiousness is the best personality factor predictive of CWB. This parallels the meta-analysis by Organ and Ryan (1995) who found that conscientiousness is the best personality predictor of OCB. Parallel meta-analytic research has also shown that the organizational justice correlation with CWB and OCB are similar (cf. Colquitt, Conlon, Wesson, Porter, & Ng, 2001).

In summary, voluminous research on CWB as a performance dimension has been presented over the past two decades. Research suggest similar personality (e.g., conscientiousness) and situational antecedents (e.g., organizational justice) and factor analyses across different CWB behaviors have found evidence for a general factor. The correlation between CWB and OCB or CIP has been modest (.23 and .32, respectively – see Dalal, 2005, and Harari et al., 2016) but these two meta-analytic estimates have employed coefficient alphas to correct the performance dimensions for unreliability. Given that inter-rater reliability is the appropriate reliability coefficient (Schmidt, Viswesvaran, & Ones, 2000; Viswesvaran, Ones, Schmidt, Le, & Oh, 2014;), the CWB–CIP and OCB–CWB correlations are underestimates. Although the corrected correlations are distinct from 1.0 suggesting uniqueness, nevertheless, the dimensions share substantial variation suggesting the presence of an overall general factor underlying the different dimensions (Viswesvaran et al., 2005). We now turn the review to recent developments in stand alone-general performance dimensions reviewed in the last edition of the *Handbook* in 2001.

Developments in OCB and Task Performance since 2001

Since the last edition of this chapter, a number of studies have been conducted into the dimensionality of OCB. Since the conception of the construct, several dimensional models of OCB have been proposed. Organ (1988) proposed a five-dimension

model, including altruism, conscientiousness, sportsmanship, courtesy, and civic virtue. Williams and Anderson (1991) suggested that OCB dimensions can be grouped into two higher-order dimensions: OCB-I (i.e., directed toward individuals) and OCB-O (i.e., directed toward the organization). Recent research has sought to clarify the empirical distinctions between these various dimensions.

LePine, Erez, and Johnson (2002) meta-analytically cumulated correlations between Organ's (1988) five dimensions of OCB and assessed the correlations between these five dimensions and external variables. Their results indicated that corrected correlations between OCB dimensions were generally quite large, ranging from .40 to .87. The correlation between civic virtue and sportsmanship was the lowest ($\rho = .40$) followed by the correlation between conscientiousness and sportsmanship ($\rho = .55$). The remaining corrected correlations were .64 or greater. Further, LePine et al. (2002) did not find any evidence suggesting that the correlation between OCB and either satisfaction, commitment, fairness, leader support, or conscientiousness was influenced by the dimension of OCB assessed. That is, the five dimensions of OCB were not only highly correlated, but also shared similar patterns of correlations with external variables. LePine et al. repeated these analyses using the broader dimensions of OCB-I and OCB-O and the results were the same (i.e., the pattern of OCB-I and OCB-O external correlates were similar). The results of this study suggested that the dimensions of OCB do not appear to be empirically distinct and that the OCB dimensions should be considered parallel indicators of the same latent OCB factor.

The same conclusion was reached in a more recent meta-analysis (Hoffman, Blair, Meriac, & Woehr, 2007). Hoffman et al. used meta-analysis to construct an intercorrelation matrix between Organ's (1988) five dimensions of OCB and used confirmatory factor analysis (CFA) to test its dimensionality. Hoffman et al. specified a model whereby altruism and courtesy were indicators of an OCB-I factor and civic virtue, conscientiousness, and sportsmanship were indicators of an OCB-O factor. While this model fits the data well, the OCB-I and OCB-O factors were highly related ($\rho = .98$) and constraining the correlation between the factors to be equal to 1 did not significantly reduce model fit. The findings of Hoffman et al. were consistent with those of LePine et al. (2002) – OCB dimensions are best conceptualized as indicators of a higher-order OCB factor. A similar conclusion was reached with data from Indonesian samples (Rahman, Sulaiman, Nasir, & Omar, 2013).

An implicit assumption in the research related to OCB is that these behaviors have important implications for organizations. This was addressed empirically in a recent meta-analysis. Podsakoff, Whiting, Podsakoff, and Blume (2009) assessed the relationship between OCB and both individual- and organizational-level outcomes. In terms of individual-level outcomes, results indicated that OCB was related to performance ratings ($\rho = .60$), reward allocation decisions ($\rho = .57$), turnover intentions ($\rho = -.22$), turnover ($\rho = -.14$), and absenteeism ($\rho = -.16$). In terms of organizational-level outcomes, OCB was related to overall unit performance ($\rho = .43$), customer satisfaction ($\rho = .23$), and unit turnover ($\rho = -.22$). The findings of this meta-analysis provided support for the notion that OCB matters for both individuals and organizations.

Research has also been interested in the task performance–OCB relationship. Using meta-analytic confirmatory factor analysis, Hoffman et al. (2007) estimated a relationship of .74 between latent task performance and OCB factors. While this is a high correlation, it is not so large as to suggest that these performance dimensions are completely redundant. Along these lines, Hoffman et al. found that OCB was more strongly related to attitudinal variables (e.g., job satisfaction, distributive justice) than was task performance. The correlation between OCB and task performance estimated in a meta-analysis by Podsakoff et al. (2009) was somewhat weaker: $\rho = .47$ for OCB-I and $\rho = .54$ for OCB-O.

Rubin, Dierdorff, and Bachrach (2013) proposed and found evidence supporting a curvilinear OCB–task performance relationship. Rubin et al. drew upon resource allocation and attentional capacity theories, noting that carrying out OCB and task performance requires the allocation of finite resources. Therefore, applying resources and attention to one dimension of performance would result in less resources and attention available to apply to the other. Thus, while OCB is often found to be positively related to task performance, Rubin et al. found that this was only the case up to a point. As OCB continued to increase, the positive relationship began to diminish. This effect was stronger for OCB-O than OCB-I. Nevertheless, the cumulative evidence suggests that OCB is strongly correlated to task performance.

Job Performance Models: Developments Since 2001

In our 2001 review of the different models hypothesized to represent the latent structure of job

performance, we reviewed models focusing on specific occupations like service industry (Hunt, 1996), sales (e.g., Baier & Dugan, 1957) as well as models that generalize across occupations. For example, we reviewed the Campbell (1990) model that postulated eight factors of performance that covered the entire construct domain of the job performance construct (with the relative importance varying across situations). Viswesvaran (1993) had invoked the lexical hypothesis from the personality domain to argue that a comprehensive specification of the construct domain of job performance can be accomplished by collating all job performance measures used in the literature. Viswesvaran (2001, p. 116) stated:

A central thesis of this lexical approach is that the entire domain of job performance can be captured by culling all job performance measures used in the extant literature. This parallels the lexical hypothesis used in the personality literature which, as first enunciated by Goldberg, holds that a comprehensive description of the personality of an individual can be obtained by examining the adjectives used in the lexicon (e.g., all English language words that could be obtained/culled from a dictionary).

In the past 15 years, several content models of job performance have been postulated (cf. Koopmans, Bernaards, Hildebrandt, Schaufeli, de Vet Henrica, & van der Beek, 2011) but despite the different terminology, they are strikingly similar (Campbell & Wiernik, 2015). Campbell (2012) presents a revised 8-factor model synthesizing the recent literature with their earlier model of the construct of job performance (Campbell, McCloy, Oppler, & Sager, 1993). Campbell et al. (1993) postulated the following eight factors as underlying the construct of job performance: job-specific task proficiency, non-job-specific task proficiency, written and oral communication, demonstrating effort, maintaining personal discipline, facilitating peer and team performance, supervision, and management or administration. Based on the recent developments (reviewed above on newer dimensions like CWB), Campbell (2012) asserts the following eight factors to underlie job performance: technical performance, communication, initiative/persistence/effort, counterproductive work behavior, supervision/managerial/executive leadership, hierarchical management performance, peer/team member leadership performance, peer/team member management performance. This revised taxonomy in addition to taking into account recently introduced dimensions like CWB also accounts for the resurgence of research on team performance and how individual performance relates to team performance.

It is important to note that the specific factors or dimensions that underlie the construct of job performance will evolve with the changing nature of work. New dimensions will be introduced (CWB, CIP etc., between 2001 and 2015); the specific behaviors that define each factor (i.e., what is CIP) may change over time and across cultures and occupations. However, a model of the job performance construct need not vary with the zeitgeist. Such a model was initially proposed in the job performance domain by Viswesvaran (1993). In this model, there is a general factor at the top of the hierarchy. This general factor drives performance in multiple dimensions of job performance. Different sets of multiple dimensions can be postulated (to suit the job performance assessment in a particular situation) but an individual's standing on each dimension is a function of the general factor and a specific factor. This model is similar to the structure of cognitive abilities that have been proposed earlier (Spearman, 1923) and recently debated in the personality literature (Davies, Connelly, Ones, & Birkland, 2015; Musek, 2007).

Viswesvaran et al. (2005) tested this hierarchical model of job performance where a general factor underlies performance in 10 different job performance dimensions. Viswesvaran et al. (2005) focused on supervisory and peer ratings of performance and employed meta-analytic data to estimate correlations across the dimensions. Ratings, however, are influenced by halo which inflates the observed correlations between dimensions if they are rated by the same rater. Halo inflates all within-rater correlations and deflates all between-rater correlations in comparison to what the values will be in the absence of a halo error. Thus, when the within-rater observed interdimension correlations are employed to test for the general factor, the magnitude of the general factor will be inflated by halo. However, the observed between-rater interdimension correlations are deflated by halo – using them will underestimate the general factor.

Viswesvaran et al. (2005) countered the deflationary effects of halo on the observed between-rater interdimension correlations by correcting them with inter-rater reliability estimates (which are also affected by halo in addition to random error and transient error). Results indicated that 60% of the variance shared across dimensions can be attributed to the general factor (even after accounting for halo). These findings were consistent with a higher-order general factor of job performance. Thus, the appropriate conceptualization of the dimensionality of job performance is one of a hierarchy, where a general factor of job performance is at the apex, encompassing more narrow dimensions.

Little research has questioned the existence of a general factor of job performance, but some has questioned its exact magnitude. Viswesvaran et al. (2005) found that the general factor accounted for 60% of the variance in performance dimensions. In a primary study, Hoffman, Lance, Bynum, and Gentry (2010) reported that the general factor of job performance accounted for a much smaller percent of the variance in performance ratings – a finding that is highly discrepant from that observed in Viswesvaran et al. (2005). It is possible that this discrepancy is due to differences in the conceptualization of the general factor. Specifically, the general factor as initially proposed and tested in Viswesvaran et al. (2005) was that of a higher-order factor. That is, the general factor was proposed to account for the covariation among dimensions of job performance. On the other hand, Hoffman et al. (2010) conceptualized the general factor as a method factor that was orthogonal to the dimensions of job performance. Furthermore, the data employed by Hoffman et al. was collected for training and developmental feedback – designed to maximize differences between dimensions to highlight the strengths and weaknesses of individuals. We underscore that future research that is interested in estimating the magnitude of a general factor of job performance must pay careful attention to how the data are obtained and ensure that the general factor is in fact modeled as a higher-order factor.

MEASUREMENT METHODS

Viswesvaran (2001) provided a historical overview of measurement methods (i.e., rating scales) in the last edition of this *Handbook*. Measurement methods is an area where there have been scant new developments. This could perhaps be attributed to Landy and Farr's (1980) suggested moratorium on performance rating scale research, due to their observation that the accumulated research up to that point provided little evidence suggesting that rating scale influenced the quality of performance ratings. However, some key developments have occurred in this area more recently. These include the development of Computer Adaptive Rating Scales (CARS) and Frame-of-Reference Scales (FORS).

Borman, Buck, Hanson, Motowidlo, Stark, and Drasgow (2001) proposed CARS as a means to improve the effectiveness of forced-choice rating scales. In short, forced-choice rating formats present raters with pairs of behavioral statements and the rater is to select the statement that best

describes the ratee. This approach was intended to reduce bias in performance ratings because raters would not know which of the two statements characterizes effective versus ineffective performance. Borman et al. proposed that item response theory (IRT) could be applied to this procedure in order to improve the quality of performance ratings. Specifically, Borman et al. applied adaptive testing principles. As raters chose between pairs of statements, a rating algorithm selected subsequent behavioral statements that were somewhat above and somewhat below the level of effectiveness indicated in the prior step. Based on the behavioral statement selection, the initial ratee performance estimate was revised. This iterative process would continue presenting up to 15 pairs of behavioral statements for each performance dimension.

Borman et al. (2001) conducted a laboratory study in order to test the reliability and accuracy of ratings made using CARS as compared to ratings of the same ratees made using a graphic rating scale (GRS) and behaviorally anchored rating scale (BARS). In terms of reliability, results indicated that inter-rater reliability was higher for participants who rated performance using CARS as opposed to GRS and BARS. Standard errors of rating scores from CARS were between 23% and 37% lower than the standard errors of ratings made using GRS and BARS. Accuracy of ratings was assessed using all four of Cronbach's (1955) accuracy formulas. Results consistently suggested that CARS ratings were more accurate than were GRS and BARS ratings.

More recently, Hoffman, Gorman, Blair, Meriac, Overstreet, and Atchley (2012) developed Frame-of-Reference Scales (FORS). Hoffman et al. integrated the same concepts that underlie frame-of-reference rater training into the rating scale development process. In short, frame-of-reference training involves explaining the multidimensionality of performance to raters, defining the different performance dimensions to be rated, and providing raters with several behavioral examples of effective and ineffective performance for each dimension. By providing raters with a common frame-of-reference for what constitutes varying levels of performance, the intervention would be anticipated to improve the quality of performance ratings. Indeed, empirical research supports this prediction (Woehr & Huffcutt, 1994).

Hoffman et al. (2012) developed ratings scales (FORS) that had embedded within them some key characteristics of frame-of-reference training. For each dimension to be rated, the scale included definitions as well as behavioral examples of different levels of performance. Hoffman et al. found that ratings made using FORS had superior psychometric properties than ratings made using a

behavioral observation scale (BOS). For example, ratings made using FORS exhibited smaller correlations between distinct dimensions than when ratings were made using the BOS. FORS ratings were also associated with less measurement error (specifically, a 10% decrease). In a second (laboratory) study, Hoffman et al. assessed rating quality across three conditions: FORS, behavioral checklist with frame-of-reference training, and control (behavioral checklist with no frame-of-reference training). Note that the FORS was the same as the behavioral checklist, but it included examples of effective and ineffective levels of performance for each dimension to be rated. Results indicated that raters assigned to the FORS condition rated performance significantly more accurately than did raters in the control condition. Rating accuracy did not vary between FORS and frame-of-reference training conditions.

MEASUREMENT ISSUES

Reliability

In the measurement of any construct, unreliability is an important issue to consider (Schmidt & Hunter, 1996). According to classical test theory (cf. Allen & Yen, 1979; Gulliksen, 1950), the observed scores in any measure are an additive sum of true and error scores whereas other conceptualizations (e.g., generalizability theory) break the error component into different sources. However, the fundamental assumption that the observed score includes a true component and an unwanted (i.e., error for that measurement purpose) component, remains in all conceptualizations.

Different reliability coefficients have been presented that treat random responses, item-specific variance, transient variance, and rater (observer/coder) idiosyncratic variance as error variance. Coefficient alpha is frequently reported in the published literature, and the alpha coefficient treats variance specific to items as error variance. As noted in Viswesvaran, Ones, and Schmidt (1996), very few studies have reported the coefficient of stability (where the same rater rates ratees at two different points in time) for performance ratings. In contrast to coefficient alpha and coefficient of stability (rate-rater correlation with the same rater) which are both intra-rater reliability estimates, the inter-rater reliability estimates treat rater idiosyncratic variance as error variance. When an organization is interested in assessing the job performance of an individual, the focus is on the individual's performance and not on the

rater's idiosyncratic viewpoint. As such, the inter-rater reliability represents the correct estimate of unreliability in performance ratings (Ones, Viswesvaran, & Schmidt, 2008; Schmidt et al., 2000; Viswesvaran et al., 2014).

Viswesvaran et al. (1996) presented the meta-analytic cumulation of reliability estimates reported in the literature for peer and supervisory ratings of 10 different job performance dimensions. Both inter-rater and intra-rater reliability estimates were summarized. One of the findings reported in that study – the inter-rater reliability of supervisory ratings of overall job performance is .52 – has generated much debate over the past 20 years. Murphy and DeShon (2000) argued that inter-rater correlations do not reflect inter-rater reliability of ratings because in any organizational setting it is impossible to get two raters who can be considered as parallel measures. For example, raters differ in leniency and central tendency – the standard deviation of ratings will differ across the raters. Schmidt et al. (2000) present arguments to rebut this and other claims made in Murphy and DeShon (2000). Specifically, the two raters should have equal variances only if we are restricted to classically parallel measures (Allen & Yen, 1979). For other forms of parallelism (tau-equivalent, essentially tau-equivalent, and congeneric parallelism), equality of observed variances across parallel measures is not a requirement. Second, a typical rating scale will use a Likert Scale of 1–5, and standard deviations between raters are unlikely to vary by more than 20%. Allen and Yen (1979) report an example where the standard deviations of two parallel measures differed by 20% but the reliability estimate based on assumptions of classical parallelism differed from a more stratified analyses only in the second decimal place.

Murphy (2008) argued that an inter-rater reliability of .52 is very low and if true, we need to ask whether important administrative decisions (selection, merit raises, etc.) can be made with such unreliable ratings. In short, Murphy (2008) argues that supervisory ratings may not reflect individual job performance – the construct validity of supervisory ratings of overall job performance is questionable. Ones et al. (2008) countered that important administrative decisions should not be based on a single supervisor's ratings but the ratings from different supervisors can be averaged for a more reliable assessment. For example, using the Spearman-Brown Prophecy formula, we can estimate that we need 9 raters to get a reliability of .90 (with the reliability of a single supervisor rating being .52). Ones et al. (2008) also pointed out considerable empirical evidence for the construct validity of supervisory ratings of job performance. In fact, in a later section of this chapter

we summarize the construct validity evidence for supervisory ratings of job performance.

Finally, LeBreton, Scherer, and James (2014) questioned the use of .52 as an estimate of the inter-rater reliability of supervisory ratings of job performance. Several commentators to that focal article (Sackett, 2014; Shen, Cucina, Walmsley, & Seltzer, 2014; Viswesvaran et al., 2014) refuted LeBreton et al.'s assertions and pointed out that the empirical evidence is robust and clear: The inter-rater reliability of supervisory ratings of overall job performance is .52. Measurement error obfuscates all scientific knowledge and the path to a cumulative and evidence-based science and practice of IWO psychology requires corrections for unreliability (Charles, 2005; Viswesvaran et al., 2014).

360-Degree Feedback and Source Effects

The introduction of 360-degree feedback (also referred to as multisource feedback or multisource performance ratings) is widely regarded as a favorable development in the practice of IWO Psychology. As reviewed above, while the reliability of a single rater's performance rating is somewhat low (.52 for supervisory ratings), the reliability can be improved by pooling ratings across multiple raters. However, pooling ratings across raters who occupy different sources requires the precondition that ratings derived from raters in different sources are comparable. The question of comparability between raters from different sources has garnered a great deal of empirical attention.

Viswesvaran, Schmidt, and Ones (2002) addressed this issue using meta-analysis. Viswesvaran et al. cumulated correlations between supervisor and peer ratings of nine different dimensions of job performance. Once accounting for the biasing effect of measurement error, results indicated that the same construct was assessed by peer and supervisor ratings of the following job performance dimensions: overall job performance, productivity, effort, job knowledge, quality, and leadership. For ratings of administrative competence, interpersonal competence, and compliance/acceptance of authority, peer and supervisors were assessing different constructs. While there was some discrepancy in findings, overall, the results supported equivalence of peer and supervisory ratings.

Scullen, Mount, and Judge (2003) tested the construct validity of developmental multisource feedback ratings. Across sources, the best fitting model was one where four performance

dimensions loaded onto one higher-order factor (i.e., a general factor of job performance, discussed earlier). Scullen et al. tested the equivalence of the measurement model across rating perspectives. Results supported invariance across supervisors, peers, and subordinates. This study provided additional evidence for the equivalence of ratings derived from raters across perspectives.

While research suggests that peer, supervisor, and subordinate ratings are equivalent, this is not the case for self-ratings. In the Scullen et al. (2003) study just referenced, self-ratings were not equivalent to supervisor, peer, and subordinate ratings. Specifically, the variance of self-ratings was much lower than that of other ratings, suggesting that self-raters use a more narrow range of the rating scale when evaluating their own performance. Heidemeier and Moser (2009) used meta-analysis to assess self–other job performance rating agreement using two indices: correlation and mean differences between self and supervisor ratings. Across 115 independent samples and a total sample size of 37,752, results indicated a modest correlation between self and supervisor performance ratings ($\rho = .34$). Further, across 89 independent samples and a total sample size of 35,417, results indicated that self-ratings were higher or more lenient than supervisor ratings ($d = .49$).

Construct Validity

The last edition of this chapter reviewed a large body of evidence suggesting that, while not perfect, the construct validity of supervisory performance ratings is quite good. We briefly review this research here, followed by new developments in the area. One line of evidence is the relationship between supervisory ratings of job performance and objective measures of job performance. In the most recent meta-analysis along these lines, Bommer, Johnson, Rich, Podsakoff, and Mackenzie (1995) estimated a population correlation of $\rho = .39$. Interpreted against Cohen's (1992) rules of thumb, this value is considered medium-to-large in magnitude. However, this value may appear modest to some and might seem to suggest that the construct validity of performance ratings is in fact poor (Murphy, 2008). Note that this value was derived by cumulating correlations between any objective measure of job performance and supervisory ratings of any dimension of job performance. That is to say, it was not necessary that the objective and subjective measures assessed the same performance dimension. Using a subset of correlations where the objective and subjective measures were both assessing production quantity,

Bommer et al. (1995) estimated a population correlation of $\rho = .71$. This finding suggests that, when assessing the same performance dimension, objective and subjective performance ratings converge to a great degree, providing evidence supporting the construct validity of performance ratings.

Job performance ratings also correlate as anticipated with determinants of performance – knowledge, skills, abilities, and other characteristics. For instance, cognitive ability *should* predict work performance and therefore, if performance ratings were construct valid, cognitive ability would correlate with them. An overwhelmingly large body of research suggests that this is in fact the case. Most recently, Hunter, Schmidt, and Le (2006) reported a population cognitive ability–job performance rating relationship (for average complexity jobs) of $\rho = .66$. Performance ratings also converge with measures of skills, such as work samples ($\rho = .34$; Roth, Bobko, & McFarland, 2005) as well as measures of job knowledge ($\rho = .42$; Schmidt, Hunter, & Outerbridge, 1986). Ratings of job performance also correlate as anticipated with personality traits such as integrity (Ones, Dilchert, Viswesvaran, & Judge, 2007; Ones et al., 1993).

Performance ratings and objective measures of performance also have similar patterns of relationships with external variables. For example, Roth et al. (2005) did not find any evidence suggesting that the work sample–job performance relationship was moderated by criterion type (i.e., objective vs. subjective; $\rho = .30$ vs. $.34$). Similarly, in a comprehensive meta-analysis of integrity test validities, Ones et al. (1993) found that the operational validity coefficient for objective ($\rho = .28$) and subjective ($\rho = .35$) performance measures was comparable.

While the existing body of evidence overwhelmingly supports the construct validity of performance ratings, we do not contend that the construct validity of performance ratings is perfect. Along these lines, more recent research has examined potential sources of performance-irrelevant variance in job performance ratings. Sutton, Baldwin, Wood, and Hoffman (2013) reported the results of a meta-analysis of the rater liking–performance rating literature. Rater liking refers to the rater's affective regard for the ratee. Their results indicated a very strong correlation between rater liking for the ratee and performance ratings ($\rho = .77$), suggesting that the more a rater liked a ratee, the higher the performance ratings were. However, a narrative review of studies indicated that much of this effect seemed to be due to a tendency for raters to like higher performing subordinates. That is, it was not just liking that influenced performance ratings, but performance

that influenced rater liking (this is not to suggest that rater liking does not bias performance ratings at all, but that the effect is likely smaller than the .77 corrected correlation suggests).

Another line of inquiry into performance-irrelevant sources of variance in ratings of job performance relates to rater personality traits. Several studies have been conducted into this issue (e.g., Bernardin, Cooke, & Villanova, 2000; Bernardin, Tyler, & Villanova, 2009) and a recent meta-analysis found that rater personality traits consistent with the Five Factor Model accounted for between 6% and 22% of the variance in performance ratings (Harari, Rudolph, & Laginess, 2015). Relative weight analyses suggested that this effect was predominantly driven by agreeableness, such that raters who were higher in agreeableness gave higher performance ratings. Extraversion and emotional stability were also positively related to performance ratings, while conscientiousness and openness did not have much of an effect. Harari et al. (2015) drew upon the principle of situational strength, suggesting that the effects would be stronger when ratings were collected for research/developmental purposes vs. administrative purposes and when raters were unaccountable vs. accountable for their ratings. Results were largely consistent with these predictions. Thus, to the extent that rater personality traits contaminate performance ratings, introducing an accountability intervention could reduce this effect (Harari & Rudolph, 2017).

Dierdorff and Surface (2007) examined the effect of rating context characteristics on peer ratings of job performance. Dierdorff and Surface drew a comparison to the principle of situational strength found in the personality literature, suggesting that a *strong* rating situation is one where the rating context provides the raters with cues that clearly delineate exactly what constitutes effective versus ineffective performance on a given performance dimension in the particular situation. Building on this idea, they argued that in strong rating situations, the variance in performance ratings due to ratee behaviors should increase, while the opposite would be observed in weak rating situations. Consistent with predictions, ratee performance accounted for a greater portion of variance in performance ratings in situations that were strong for the particular performance dimension as compared to situations that were weak for the particular performance dimension. As an example, one situation was predicted to be strong for a teamwork dimension. In this situation, ratee performance accounted for 57% of the variance in peer teamwork ratings. In the other situations that were determined to be weak for teamwork, ratee performance accounted for only between 6% and

37% of the variance in peer teamwork ratings. This work provided evidence suggesting that characteristics of the rating context can influence the construct validity of performance ratings.

Note that the evidence just reviewed does not negate the evidence summarized above and detailed in the last edition of this chapter supporting the construct validity of performance ratings. Like any measure of any construct, the construct validity of performance ratings is not perfect. Studying sources of performance-irrelevant variance in performance ratings is useful and has the potential to continue to improve the construct validity of performance ratings into the future. However, despite the evidence suggesting that rater liking, rater personality traits, and rating context characteristics can impact performance rating scores, evidence does nonetheless overwhelmingly suggest that performance ratings have good construct validity.

Dynamicity

Interest in the temporal dimensionality of job performance has been pervasive in the IWO Psychology literature. Early research considered the question ‘does job performance change across time?’. Historically, the following three lines of evidence were examined to address this question: (1) group-mean level changes in job performance scores across time, (2) changes to predictor–criterion relationships across time, and (3) inter-correlations among performance scores across time (Barrett, Caldwell, & Alexander, 1985). Among these definitions, the third one, pertaining to criterion–criterion correlations across time, best addresses this issue (cf. Sturman, 2007) and will therefore receive the greatest amount of attention in the present review.

The group-mean level changes approach has been repeatedly criticized as being conceptually weak and as being insufficient for addressing individual-level changes in job performance across time (Barrett et al., 1985; Sturman, 2007). We agree with these criticisms. Indeed, group-mean level changes in job performance scores across time provide no insight concerning whether or not rank-order changes are occurring nor does this approach provide any insights concerning individual performance change. For these reasons, as well as the application of longitudinal data analysis methods (which address many of the issues levied against the group-mean level changes approach), research examining criterion dynamicity in this manner is no longer prevalent in the empirical literature.

Examining changes in predictor–criterion relationships across successive criterion measurement occasions has also been employed as a popular means of assessing criterion dynamicity (Bass, 1962; Ghiselli & Haire, 1960). Most problematic with this approach is that dynamic criterion-related validity coefficients is a potential outcome of performance change rather than an indicator of performance change per se (Sturman, 2007). That is, while dynamic validity coefficients would indicate performance change, it is also possible that performance can change without significantly influencing validity coefficients. Also, and consistent with the criticisms noted above in terms of the group-mean level changes line of evidence, examining the dynamicity of validity coefficients provides no insight concerning the manner in which job performance changes across time at the individual level. While dynamic validity coefficients are an important potential outcome of dynamic criteria, examining these effects is not a useful means of understanding performance change.

Research into the correlation between criterion scores measured at different points in time has provided the best insight into the extent to which rank-order changes in job performance scores occur across time. Research along these lines has consistently looked for evidence of a *simplex pattern* (i.e., a decrease in the magnitude of criterion–criterion correlation coefficients as the time between measurement occasions increases; Austin, Humphreys, & Hulin, 1989). This pattern will suggest that job performance does tend to change over time, and the longer the period of time, the greater the extent of job performance change.

However, even this research was difficult to interpret meaningfully. One persistent issue was the effect of measurement error on the criterion–criterion correlations. That is, true rank-order performance change across time was confounded with test-retest reliability in each of these studies, and therefore, the extent of actual performance change was unclear (Barrett et al., 1985). In a recent meta-analytic review, Sturman, Cheramie, and Cashen (2005) disentangled the influence of test-retest reliability from true performance change on criterion–criterion correlations across time. This research also assessed job complexity (i.e., high vs. low) and criterion type (i.e., objective vs. subjective) as moderators of the stability of job performance across time. The results of this study indicated that a simplex pattern did adequately describe criterion–criterion correlations (though the true changes to job performance across time were not as drastic as indicated by observed correlations). Temporal stability was greater for high complexity jobs as compared to low complexity

jobs and for subjective measures as compared to objective measures.

The Sturman et al. (2005) meta-analysis is the most comprehensive analysis to date into the question ‘does job performance change across time?’. The results of this study clearly illustrate that rank-order changes in job performance across time do in fact occur. However, while understanding whether or not performance changes at the individual-level across time is a critical issue, research has also been interested in understanding the manner in which job performance unfolds across time at the individual level. Research has applied longitudinal data analysis methods to this issue in order to assess individual-level change patterns in job performance scores across time.

At present, a large body of research has emerged addressing this issue of intra-individual performance trajectories using one of two approaches – random coefficients modeling and latent growth modeling. While important distinctions between these methods exist, they both involve estimating an intercept parameter (i.e., initial performance), a slope parameter (i.e., performance change), and the amount of variability around each (we refer readers to the following comprehensive discussions of these methodologies: Bliese & Ployhart, 2002; Chan, 2002.) Employing these methods, across a wide number of studies including different jobs and performance criteria, research has indicated slope parameters suggesting that performance across time can be characterized in terms of a negative quadratic trend (Hofmann, Jacobs, & Baratta, 1993; Minbashian, Earl, & Bright, 2013; Ployhart & Hakel, 1998). That is, performance seems to increase most rapidly early on and ultimately reaches a point where it begins to level off (or even slightly decrease). However, this research has also identified considerable variability in performance growth parameters, suggesting that performance unfolds across time differently for different employees.

An interesting line of research to emerge from this area has been research into predictors of performance growth parameters. For example, research indicates that cognitive ability is positively related to performance growth (Deadrick, Bennett, & Russell, 1997). Research has also examined personality traits consistent with the Five Factor Model as predictors of performance trends, findings that openness to experience is associated with performance trends, such that the performance of employees who are high in openness is less likely to plateau as time passes (Minbashian et al., 2013; Thoresen, Bradley, Bliese, & Thoresen, 2004).

The literature reviewed here is reflective of the existing literature and historical perspectives on dynamic criteria, as we focused on changes to job

performance that occur over the relative long term. However, recent research has emphasized changes in job performance that occur over the near term (e.g., hours, days, weeks) as well, often referred to as *within-person performance variation* (Dalal, Lam, Weiss, Welch, & Hulin, 2009). Work along these lines was largely spurred by *affective events theory*, which, in short, states that employees respond to affect-laden events in the workplace with emotional responses that have implications for attitudinal and behavioral outcomes (Weiss & Cropanzano, 1996). Drawing on the affective events framework, research began to indicate that state affectivity had implications for momentary levels of work performance. For example, Miner and Glomb (2010), in a sample of call center employees, measured affect at 4–5 random intervals throughout the day and assessed the effect of affect on objective measures of job performance collected in 30-minute blocks around the administration of the affect measure. Their results supported within-person relationships between positive affect and on objective task performance measures. Many other studies have identified similar effects (cf. Ashkanasy & Humphrey, 2011 for a review).

CAUSAL MODELS

In this section, we review causal models that specify how individual differences variables are linked to different dimensions of job performance. Hunter (1983) proposed and found evidence supporting a model whereby the relationship between cognitive ability and job performance was fully mediated through job knowledge and skills (also note that the relationship between job knowledge and job performance was partially mediated through skills). Schmidt et al. (1986) expanded Hunter’s original model to include job experience, finding that the relationship between job experience and job performance was also fully mediated through job knowledge and skills. This same model was found to generalize to a sample of supervisors in military jobs in a subsequent study (Borman, Hanson, Oppler, Pulakos, & White, 1993).

Barrick, Mount, and Strauss (1993) found evidence for a model whereby the relationship between conscientiousness and both objective and subjective measures of job performance was mediated through goal setting. Barrick, Stewart, and Piotrowski (2002) proposed a model that accounted for the conscientiousness– and extraversion–sales performance relationships. Barrick et al. argued that broad personality traits should influence job performance through broad

motivational constructs and found support for a model whereby the relationship between extraversion and sales performance was fully mediated through *status striving*. Furthermore, conscientiousness influenced *accomplishment striving*, which then influenced job performance through the status striving motivation.

Research has also examined how individual differences variables relate to OCB and CWB. Ilies, Fulmer, Spitzmuller, and Johnson (2009) found support for a model whereby the conscientiousness- and agreeableness-OCB relationships were partially mediated through job satisfaction. Mount, Ilies, and Johnson (2006) found that the relationship between agreeableness and CWB was partially mediated through job satisfaction.

Finally, consistent with the earlier discussion pertaining to within-person performance variation, research has proposed and tested path models linking affective states to job performance. Beal, Weiss, Barros, and MacDermid (2005) proposed a model whereby the relationship between mood and job performance was mediated through cognitive and regulatory processes. Beal et al. argued that, in order to perform a work-related task successfully, employees must mobilize their resources (e.g., knowledge, skills, abilities, characteristics) in order to address the task at hand and that this requires focusing one's attention on said task. According to the model, affective states can influence this process by drawing an employee's attention away from the task.

In summary, causal modeling research with job performance has incorporated individual differences variables like general mental ability (GMA) and conscientiousness as well as mood and motivational states. Future research should also consider how dimensions themselves relate to one another. For example, OCB can facilitate the building of trust and cohesion which paves the way for Creative and Innovative performance.

DEMOGRAPHIC DIFFERENCES

Research has been interested in examining subgroup differences in job performance scores. In terms of ethnic group differences, research has focused on white-black comparisons. Roth, Huffcutt, and Bobko (2003) conducted a meta-analytic review into this issue. Overall, their results indicated subgroup differences in job performance measures favoring whites ($d = .27$). Their results also indicated that differences in measures of job knowledge and work sample performance were even larger ($d = .48$ and $.52$, respectively).

McKay and McDaniel (2006) followed up on Roth et al.'s (2003) study, also using meta-analytic methods. McKay and McDaniel's work built on that of Roth et al. by examining a number of relevant moderators. Overall, their results indicated white-black mean group differences in job performance of $d = .27$, the exact value observed in Roth et al. However, their results also indicated that the difference was somewhat larger for subjective performance measures ($d = .28$) as compared to objective measures ($d = .22$). Finally, the results also indicated that white-black differences in job performance were larger for task performance ($d = .21$) as compared to contextual performance ($d = .13$).

Research has also examined gender differences in job performance measures. In a cumulative meta-analytic review, Roth, Purvis, and Bobko (2012) found overall male-female differences in job performance of $d = -.10$, suggesting that female performance was somewhat higher than that of males. This effect was larger for supervisory ratings ($d = -.13$) as compared to objective measures ($d = -.02$). However, males scored higher than females in terms of promotability ratings ($d = .10$). Sinangil and Ones (2003) report gender differences in the job performance assessment of expatriates. Results did not indicate any significant differences across all performance dimensions examined.

Finally, Ng and Feldman (2008) reported the results of a comprehensive meta-analysis into the age-job performance relationship. They included 10 dimensions of job performance: task performance, creativity, training performance, OCB, safety performance, general CWB, workplace aggression, on-the-job substance abuse, tardiness, and absenteeism. The relationship between age and task performance was small and essentially zero ($\rho = .02$). In terms of prosocial behaviors, age was consistently positively related. For example, age was positively related to OCB ($\rho = .08$) and safety behaviors ($\rho = .10$) and negatively related to counterproductive behaviors in general ($\rho = -.12$) and specific behaviors such as aggression ($\rho = -.08$) and tardiness ($\rho = -.28$). However, age was negatively associated with training performance ($\rho = -.04$). Overall, these results suggested that older employees make positive contributions toward organizational effectiveness.

CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

Job performance is a central construct in IWO research and the last 15 years (2001–2016) have resulted in significant advances. The factor

structure of job performance has been shown to be hierarchical with a general factor at the apex causally influencing performance in multiple dimensions (each being influenced by the general factor and a specific factor). Each dimension in turn can be causally related to specific measures. This hierarchical structure provides a scientific basis for the construct of job performance and brings coherence to the multiple models of job performance, each slicing the construct in different ways to match the specific situational contexts. Similarly, when new job performance dimensions are introduced to meet the zeitgeist (e.g., hierarchical management performance – cf. Campbell, 2012) or older dimensions deleted (e.g., job-specific task performance), the hierarchical structure provides stability and continuity. In the past 15 years, research has introduced new performance dimensions like CWB and CIP. The hierarchical structure of job performance with a general factor at the apex provides continuity to our research base. For example, Harari et al. (2016) found that the performance dimension of CIP is increasingly assessed in the knowledge economy; Harari et al. (2016) meta-analytically cumulated the reported correlations between this dimension and other established dimensions, and thus were able to situate this new dimension in the job performance construct domain space.

The magnitude of the general factor of job performance after unconfounding the effects of halo error is substantial. Future research should assess the dynamicity of the general factor versus the dynamicity of specific dimensions. We suspect more stability at the level of the general factor compared to more dynamicity of specific underlying dimensions. Future research is also needed on the generalizability of the general factor across cultures. One issue raised recently is whether the general factor reflects a causal latent variable or reflects a formative construct (Borsboom, Mellenbergh, & van Heerden, 2003). Campbell and Wiernik (2015) opine that it is a formative construct and suggest differential validity and different rates of dynamicity for the different dimensions. In our review, we find scant empirical evidence for differential validity (e.g., GMA is the best predictor for most of these dimensions) and causal models of performance do not present different path mechanisms for the different dimensions. Many hypotheses have been presented (and some tested on limited samples) but research should collect the necessary robust data to test these interesting hypotheses.

The inter-rater reliability of supervisory ratings of job performance has been robustly established (Viswesvaran et al. 1996) as .52 by several independent meta-analyses (Salgado & Moscoso, 1996; Shen, Beatty, & Sackett, 2009). In organizations,

the evaluation of an individual's job performance is done to generalize across the specific rater (supervisor or peer), time of assessment, and specific questions used in that assessment. That is, we are interested in finding whether candidate performance in a selection interview relates to performance later in the job – performance that is not idiosyncratically defined by one supervisor at one point in time with a specific set of questions. The inter-rater reliability estimate comes closest to capturing the unwanted variance, and reliability corrections of job performance measurements with inter-rater reliability comes closest to obtaining the generalizability required in organizational sciences (Schmidt et al., 2000). Others agree – e.g., Sackett, Laczko, and Arvey (2002, p. 809) state that 'the type of reliability estimates used to correct validity estimates for measurement error are predominantly inter-rater reliability estimates'.

Future research should explore new dimensions of job performance that become salient in a global economy. Is there a global mindset and how do individual differences here relate with other performance dimensions? Also, environmental sustainability is an important issue and we need to investigate individual differences employee green behaviors (Ones & Dilchert, 2012) and how it relates to other performance dimensions. Causal models of job performance should incorporate the new dimensions.

Job performance is a central construct in IWO psychology and all our interventions are designed to influence employee performance (either directly or indirectly). As Campbell and Wiernik (2015, p. 48) stated '[w]ithout individual [job] performance there is no team performance, no unit performance, ... no economic sector performance, no GDP. ... without individual job performance, there can be no job to be satisfied with, no organization to be committed to, and no work to balance with family'. The science and practice of IWO Psychology is based on the appropriate conceptualization, measurement, and interpretation of individual job performance. Given this centrality of individual job performance assessment to our field, we are happy to note that research on individual job performance has been thriving in the past 15 years (2001–2016), and we look forward to exciting breakthroughs in the coming decades.

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Conceptualization and Measurement of Typical and Maximum Performance

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INTRODUCTION

The story of the distinction between typical and maximum performance started with a chance situation leading to a surprising finding (Sackett, 2007): Working on an applied validation study for the selection of supermarket cashiers, Sackett, Zedeck, and Fogli (1988) had to handle two versions of their criterion-measure, i.e., the speed and accuracy with which supermarket cashiers processed items. At that time, only some supermarkets already used electronic cashier systems that enabled the researchers to assess cashiers' performance in an automatic and discreet manner over the course of days and weeks. Other supermarkets hadn't yet installed such equipment and consequently, Sackett et al. had to rely on supervisors assessing cashiers' processing speed and accuracy. For this purpose, supervisors assembled shopping carts filled with predetermined goods and timed with stopwatches how fast and accurately cashiers processed them.

To the researchers' dismay, these two types of measures did not render comparable results, even though they targeted the same construct. Once Sackett et al. had determined that this discrepancy wasn't caused by methodological artifacts, they were left with only one possible conclusion: they were actually assessing two different dimensions

of performance. While the electronic monitoring allowed the assessment of performance under non-evaluative day-to-day conditions, then labeled *typical* performance, supervisors' evaluation of performance on the predetermined shopping carts happened under short but obviously evaluative situations, then labeled *maximum* performance.

Besides being a cute story, this anecdote is also symptomatic of the study of job performance in general: While performance – employee behavior relevant to the goals of the organization (Campbell, 1990; McCloy, Campbell, & Cudeck, 1994) – is a core criterion in human resource decisions, it is also a difficult variable to grasp and measure in all its multidimensionality and complexity (Austin & Villanova, 1992; Borman, 1991; Campbell, 1990). Early models saw performance as a stable or static phenomenon, interpreting deviations from mean performance as a lack of extrinsic and intrinsic reliability and thus as task irrelevant error or noise (Thorndike, 1949). Yet, individual job performance is also characterized by temporal multidimensionality and variability (Barnes & Morgeson, 2007). Besides idiosyncratic profiles of personal strengths and weaknesses, performance changes over time (Cascio & Aguinis, 2011) and even shows substantial and meaningful within-person-variability within the same general time-frame of a performer's career and on the exact same

task. Stewart and Nandkeolyar (2006) found that 73% of the variance in the weekly sales of 167 salespeople happened within-person. Similarly, Fisher and Noble (2004) asked 121 employees to report their task performance five times per day for two weeks and found that 77% of the variance in self-ratings of performance was within-person. Obviously, individuals do not perform at exactly the same level at all times. This, however, does not mean that early models of stable performance differences are wrong per se. Latent growth curve approaches model intraindividual changes in performance with interindividual differences in such change (Deadrick, Bennett, & Russell, 1997; Hofmann, Jacobs, & Baratta, 1993; Hofmann, Jacobs, & Gerris, 1992; Ployhart & Hakel, 1998). Therefore, comprehensive theory of performance needs to address the stable and the dynamic aspects of performance.

The two dominant approaches that incorporate such intraindividual performance variations into performance measurement models are the system approach and the differentiation between typical and maximum performance. The systems approach attempts to single out and combine different causes of performance variability stemming from the system (i.e., the organizational context) and the individual (Deadrick & Gardner, 2000; Murphy & Cleveland, 1995) to explain performance variability by changing job requirements, performance expectations, and resources which in turn change performers' motivation and/or ability. The second approach is the distinction between typical and maximum performance (Sackett et al., 1988), focusing on the effects of variations in motivation on performance for exactly the same task.

In the following, we will outline the basic idea underlying the distinction between typical and maximum performance, the usual approaches used to study this distinction as well as the specific advantages and disadvantages of these different approaches. More specifically, we will try to outline causes for the striking mismatch between conceptual relevance and empirical database in this area of research, before outlining some possible remedies and directions for future research.

Ideas Underlying the Typical versus Maximum Performance Distinction

Job performance is a dynamic function of both performers' ability and motivation (Locke, Mento, & Katcher, 1978). Ability refers to performers' declarative knowledge, procedural knowledge, and procedural skills, whereas motivation consists of three choices (Campbell, 1990): (a) the choice to

exert effort (direction), (b) the choice about the level of effort to exert (level), and (c) the choice to persist (or not) in that level of exertion (persistence).

The typical–maximum performance distinction is based on the notion that performers can differ, hinging on the situation, in the quantity of direction, level, and persistence of effort that they exert on their tasks (DuBois, Sackett, Zedeck, & Fogli, 1993; Sackett et al., 1988; Sackett, 2007). In short, typical performance is the level of performance achieved over a longer time period ('what people will do', Sackett et al., 1988), while maximum performance refers to the level of performance when highly motivated ('what people can do') or 'when all attentional and motivational resources are dedicated to task performance' (Sackett, 2007, p. 182). This high motivation, in turn, has two interrelated consequences: First, the balance between ability and motivation in determining performance changes. During typical performance ('will do'), both motivation and ability should be relevant predictors of performance (Locke et al., 1978). As maximum performance situations constrain motivation to be high across all performers, however, maximum performance should be limited primarily by performers' ability ('can do', Sackett et al., 1988). Second, the resulting performance should be higher as it represents the maximum that a performer is actually capable of, or, 'the level of performance in a given domain that one can produce on demand for a short period if one chooses to exert maximum effort' (Sackett, 2007, p. 183).

Conceptual Relevance of Typical versus Maximum Performance

The distinction between typical and maximum performance bears wide-reaching conceptual and empirical consequences for diverse areas of industrial, work, and organizational psychology (e.g., Ackerman & Humphreys, 1990; Arvey & Murphy, 1998; Borman, 1991; Herriot & Anderson, 1997; Viswesvaran, Sinangil, Ones, & Anderson, 2001): Guion (1991) suggested that a low correlation between measures of typical and maximum performance may in part account for the low criterion-related validity of many selection procedures. Campbell (1990) made a similar argument, suggesting that one reason for the weak relationship between many personnel selection decisions and typical performance on the job may be that these selection decisions are often based on predictors of maximum performance instead. Such mismatch can also become quite costly with utility analyses misjudging selection procedures' actual benefits if the financial value of typical performance is

estimated on the basis of maximum performance criteria, and vice versa (Boudreau, 1991). Consequently, to Guion (1991, 1998), both researchers and practitioners needed to know which of the two aspects of performance they aim to predict, not only in validation studies, but across research situations. More specifically, Sackett and Larson (1990) warned scholars against generalizing study results from typical performance situations to maximum performance situations and vice versa. The distinction was even applied to item response theory (IRT): Chernyshenko, Stark, Chan, Drasgow, and Williams (2001) suggested that traditional IRT models may adequately portray performers' constrained responding to maximum performance situations, but not the complexity of responding to typical performance situations.

With concerns like these, the distinction between typical and maximum performance emerges regularly in the discussion section of empirical manuscripts, where it often serves to outline likely causes for unexpected findings or to suggest boundary conditions to the findings reported. Yet what is it that we actually know about this distinction? For answering this question we will first turn to different methods used to study typical versus maximum performance and then to the findings available today.

METHODS OF STUDYING THE TYPICAL VERSUS MAXIMUM PERFORMANCE DISTINCTION

Regarding the empirical study of typical versus maximum performance, the literature so far has mostly relied on two distinct approaches: (a) the study of performance situations in line with Sackett et al.'s (1988) original approach, thus classifying performance situations as calling for either typical or maximum performance, and (b) the study of performance distributions, comparing performers' average with their peak performance.

Performance Situations

Sackett et al. (1988; DuBois et al., 1993) explained variations in performance motivation through variations in performance situations: during typical performance situations, performers are commonly (a) working on their task for a longer time during which they are (b) relatively unaware that their performance may be observed or even evaluated and are thus (c) not consciously trying to

perform their 'absolute best' right now. For many jobs, typical performance situations represent the broadest part of daily activities and during such situations, direction, level, and persistence of effort may vary greatly both between and within performers: Given that their performance is not being evaluated, performers can choose to focus on the task – or on something else. Since performers received and accepted no instruction to do their very best, they can choose to invest their full level of effort or just any proportion of it. Finally, as they may tire of the task over time, performers can choose to persist in that level of effort or can reduce their efforts over time. Thus, 'typical performance focuses on choices' (Janz, 1989, p. 164) and performers' choices regarding their motivation – and thus also their resulting performance – can and will vary, depending on numerous situational and personal factors.

This does change, however, in situations of maximum performance. During maximum performance situations, performers are (a) very well aware of being evaluated, are (b) aware of and do accept implicit or explicit instructions to maximize their effort, and are (c) observed only for such a brief period of time that they can easily keep their attention focused on the task. As a consequence, motivation is arguably constrained to be high (DuBois et al., 1993; Sackett et al., 1988): The choice to perform is high, as performers know that they are being monitored and 'Unless one is inviting disciplinary action, one has little choice but to expend effort on the task in question' (DuBois et al., 1993, p. 206). The level of effort is high, given that performers are aware of and accept the instruction to expend effort. Persistence of effort, finally, is neither needed nor measured during maximum performance situations, as performance is only observed for such a short time period that performers can stay focused on the task.

Obviously, the situational conditions of evaluation, instruction, and short duration are not the only avenue for fostering maximum performance and performers may be maximally motivated for other reasons than external situational constraints, such as when task, personal fitness, working conditions, and other contextual variables support them to do so (e.g., Ryan & Deci, 2000). Thus, 'the absence of one of more [of these three situational conditions] does not preclude maximum performance' (Sackett, 2007, p. 183) and Sackett (2007, p. 182) noted that 'In retrospect, I believed we erred in calling the conditions necessary: The better statement is that the three terms are sufficient' – when these conditions are given, performers are assumed to show their maximum performance. When the three conditions are not present, however, it is harder to say whether performers'

effort truly reached its maximum level already or whether they could still invest more effort in this situation and thus likely also reach a higher level of performance.

An additional handicap of this approach to the study of typical versus maximum performance is the assumption that the proposed link from situational constraints to enhanced motivation will always work whereas performers' ability is modeled to remain stable across situations. This assumption, while logical at first glance, does ignore, however, that beside pure task-related abilities, typical and maximum performance situations may require different types of self-regulatory abilities, such as the ability to handle performance pressure and anxiety. As an example, Klehe, Anderson, and Hoefnagels (2007) found that in maximum performance situations, participants with low task-related self-efficacy experienced state-anxiety which in turn impaired their performance on the task. As a result, these participants' 'maximum performance' ended up being lower than their performance under more typical performance conditions.

While we still lack a replication of such findings from a field setting rather than the lab, a detrimental effect of maximum performance conditions on performance has been well documented for sensorimotor skills in the sports domain (Masters, 1992). 'Choking', or performing below one's level of skill, tends to occur in situations fraught with performance pressure, the anxious desire to perform especially well (Baumeister, 1984). As an example, Beilock and Carr (2001) found that experienced golfers performed on the basis of proceduralized knowledge. Golf practice in coping with self-consciousness-raising situations counteracted choking under pressure, but mere task practice in the presence or absence of other distracting stimuli did not. Thus, 'The notion that performance pressure induces self-focused attention, which in turn may lead to decrements in skill execution, is now a reasonably well-supported concept for proceduralized skills' (Beilock & Carr, 2001, p. 723). It may be due to such theory-inconsistent findings that it has been particularly the sports domain in which typical versus maximum performance has not been studied via differences in different situations but via the study of performance distributions.

Performance Distributions

Performance distributions allow the comparison between performers' average performance under any given circumstance and their highest

performance score recorded (e.g., Barnes & Morgeson, 2007; Borman, 1991; Deadrick & Gardner, 2008). This approach brings three advantages, albeit also two distinct disadvantages with it: A first advantage lies in its intuitive logic, as we will not face the above risk of 'maximum' performance scores failing to surpass and possibly even falling short of performers' typical level of performance. Second, this approach links relatively well to earlier research on performance variability, and third, data are readily accessible (something that has proven to be more difficult with Sackett et al.'s (1988) approach; see below).

However, a serious drawback of this approach is that it allows researchers to only study a result measurement, ignoring the procedure that led to that specific result. This is particularly problematic with the data-points designated as indicators of 'maximum' or rather 'peak' performance. These can be pinpointed only post-hoc the entire dataset's examination. This post-hoc identification makes any conceptual explanation about their meaning quite difficult. Thus, peak performance scores may well be due to outstanding motivation but may just as well be caused by luck and/or external circumstances. Even more, operationalizing maximum performance as absolute peak performance results in a measurement that incorporates actual performance but also measurement artifacts. Given a comparable overall distribution of scores (i.e., a set mean and standard deviation), the peak performance measured is likely to increase with the number of observations. For example, with normally distributed data, it is relatively unlikely to find a peak value surpassing the distribution's mean by more than two standard deviations, if one is looking at, let's say, only 20 points of observation. Given 200 points of observation, however, this likelihood will be drastically increased. Therefore, in the mean versus peak performance approach we would expect a stable mean but a rising peak with increasing points of observation (i.e., that the peak value is possibly not a reliable operationalization of maximum performance). The typical versus maximum performance approach according to Sackett et al. results in performance values reflecting actual performance values that are independent from the number observations. With increasing points of observation, we would expect a stable mean (reflecting typical performance) but also a stable maximum performance value (i.e., a possibly more reliable measurement, without conceptual differences to the value measured with less observations).

For illustrative purposes, let us play with a little example: Germany is a football crazy nation with a decently performing national team – despite traditionally having relatively little money invested in its diverse football clubs (at least in comparison

to British, Spanish, or Italian leagues). Yet, the national team is also generally known to be a 'tournament team', i.e., as a team that can 'bring it on' when the pressure is up. In other words, given maximum performance conditions (in line with Sackett et al.'s requirements), this team's performance supposedly surpasses their typical level of performance. As a consequence, one would expect this team to constantly perform better during qualifications for and actual tournaments during the European and World Championships than it does during friendly matches (despite their competitors obviously trying to achieve the same) – and indeed, looking at all games of the national team under its current coach (2006 to 2014; i.e., 112 games, 45 of which were friendly and 67 of which happened during qualifications or tournaments), the German team won 53% of their friendly matches, but 84% of their competitive ones. In terms of goals, they usually ended a friendly match with leading by 1 goal (winning 2.16 to 1.16), yet ended their competitive matches with leading by 2.12 goals (winning 2.82 to .70), with this difference being highly significant ($t = 2.92$; $p < .01$). If anything, then this effect has been increasing over the last few years, with a somewhat increasing tendency to lose friendly matches ($r = -.16$) and to win competitive ones ($r = .19$). In summary, the notion of a 'tournament team' does appear quite accurate.

When looking at the team's peak performance, measured by the maximum difference in scores achieved during any game of a specified year, then the reverse seems to be true with the team performing worse over time ($r = -.57$, $p < .01$). While this development does not truly fit the team's international ranking which went from position nine to position one during the same period (Elo Ratings, 2014; FIFA, 2014), results based on peak performance are also quite instable: if we scratch only one game from the records (a 13:0 against San Marino on September 6th, 2006), then this effect decreases greatly (to $r = -.21$, $p < .05$).

We are aware of no studies offering a direct comparison between traditional measurements of maximum performance and cases of peak performance, which might well correlate with one another (e.g., in the example above, all but one annual peak-performance games were won under competitive, rather than friendly, conditions). Yet, these two types of measures are distinct, both in their theoretical formulation and in their practical research implications. While traditional studies of typical versus maximum performance are more often carried out in laboratory research and in studies of administrative or other repetitive work tasks, research on peak performance is predominantly related to the sports realm (e.g., Barnes & Morgeson, 2007).

Consequently, both research approaches display differing patterns of covariates and consequences. While 'traditional' measures of typical and maximum performance usually covary meaningfully but modestly ($\rho = .42$; Beus & Whitman, 2012; combining physical, psychosocial, and administrative tasks, assessed by soft as well as hard criterion-measures, in both laboratory and field settings across North America, East Asia, and Europe), average and peak performance can correlate considerably higher with one another (e.g., $\rho = .90$; Barnes & Morgeson, 2007). As a result, Barnes and Morgeson (2007) observed that peak performance was not related to the performance evaluations (measured via compensation) after researchers controlled for performers' average performance. In contrast, Sackett et al. (1988) found that supervisory performance evaluations correlated more highly with supermarket cashiers' maximum performance than with their typical performance on the job. They explained this originally unexpected finding with supervisors being around cashiers most often during periods of high customer demand when all hands were needed at the cash-registers and that supervisors' 'primary concern regarding cashiers is whether the cashier can "turn it on" during peak periods' (p. 486). Up to now, we still lack a replication of the higher link between supervisory performance evaluations and measures of maximum, rather than typical performance, however, as well as a test on whether this finding was truly due to the relevance of high performance under maximum, rather than under typical performance conditions, and not inevitably a characteristic of supervisory performance assessments in general.

Findings on Typical versus Maximum Performance

This brings us to the empirical findings known about typical versus maximum performance. Besides a test of its underlying assumptions, most of this research so far has focused on different predictors of typical versus maximum performance. Relatively little research has started to combine this research with that of related fields, and as will be discussed, there is still much left to study.

Testing the Underlying Assumptions

The basic tenet of the typical versus maximum performance distinction centers around the elevated level of motivation during maximum

performance situations, an assumption that was only tested some 20 years after the emergence of the typical versus maximum performance distinction, and only in a laboratory study. Klehe and Anderson (2007a) asked students to find hardware prices on the Internet and to enter them into a computer program. Working on this task for about two hours, participants were not obviously observed or evaluated during most of the experiment (typical performance condition). The computer unobtrusively recorded all of the participants' actions. Only during five minutes in the midst of the experiment did the experimenter enter the room (maximum performance condition). While the experimenter invited as little interaction as possible, the observatory nature of this intrusion was obvious and as expected, results indeed showed that participants did not work significantly smarter, but that they worked harder during the short maximum performance period: They focused more on the task (measured in time working on the task), their level of effort was higher (measured in task-related clicks per minute), and persistence appears to have been less of an issue during maximum performance (development of level over time). Consequently, their performance during the maximum performance period surpassed their performance during the rest of the experiment, thus supporting Sackett et al.'s (1988; DuBois et al., 1993) assumptions.

Motivation and Ability Predicting Typical and Maximum Performance

Given such change in direction, level, and persistence of effort, Sackett et al. (1988) had also proposed the impact of both motivation and ability on performance to change under typical versus maximum performance conditions. Klehe and Anderson (2007a) indeed found that both proximal (direction, level, persistence of effort) and more distal indicators of motivation (task valence and self-efficacy) correlated significantly higher with performance during the typical than during the short maximum performance period, even though this effect was not as strong as Sackett et al. (1988) might have originally hoped for.

The opposite effect was found for participants' computer-related knowledge and their procedural skills (to which extent they applied smart strategies during their search): Although these were not the sole elements determining performance in the maximum performance condition, they became more important during the maximum, compared to the typical performance periods. In summary, results disagreed with the original idea that

variance in maximum performance would *only* be due to differences in participants' declarative knowledge and procedural skills. Yet, the role of ability indeed increased, whereas the role of motivation decreased, in accounting for performance under the maximum performance, compared to the typical performance conditions.

By now, these conclusions have also been partially supported meta-analytically (Beus & Whitman, 2012), in that other studies found stronger links between measures of ability and performance under maximum performance conditions than under typical performance conditions (e.g., DuBois et al., 1993; Marcus, Goffin, Johnston, & Rothstein, 2007; McCloy et al., 1994). Regarding motivation, results are not quite as conclusive. While they pointed in the proposed direction (with a validity of $\rho = .40$ for predicting typical and of $\rho = .30$ for predicting maximum performance), they failed to reach statistical significance across studies. Among the possible reasons for this finding is a dearth of suitable studies, which in turn vary greatly both in the setting of data collection and in the motivational predictors studied.

The Predictive Power of Personality

Related to predicting typical versus maximum performance with measures of motivation and ability is the question of the predictive power of personality for these two criteria. As a historic side note, this is also a literature from which Sackett et al. (1988) borrowed conceptually when first introducing typical and maximum performance as distinct criteria. After all, Cronbach (1960) had argued that one needs to differentiate between measures of maximum performance, such as ability tests, and measures of typical performance, such as personality tests, during personnel selection, a distinction that is still used in that literature today (Dennis, Sternberg, & Beatty, 2000).

On a surface level, linking the distinction between typical versus maximum performance criteria to their original counterpart in the personnel selection domain (Cronbach, 1960), one might argue for a close link between personality as a typical performance predictor and typical performance as a criterion. After all, personality arguably addresses *will do* aspects of performance, different from ability which arguably addresses *can do* aspects of performance. Nevertheless, such a direct link is oversimplified, as suggested by a more detailed look at different personality dimensions. Not even conscientiousness, which is theoretically strongly connected to the motivation to perform well, shows to be a uniformly better predictor of

typical than of maximum performance (Beus & Whitman, 2012), even though results again point in the proposed direction. Nor do extraversion, agreeableness, or emotional stability show consistent patterns across studies. Only openness to experience, sometimes also labeled 'intellect' and related to general mental ability (Judge, Higgins, Thoresen, & Barrick, 1999), emerged as a stronger predictor of maximum relative to typical performance across studies (Beus & Whitman, 2012).

Using and Refining the Typical versus Maximum Performance Argument

In summary, results do confirm the greater impact of ability and related constructs on maximum than on typical performance, but are less conclusive about the better prediction of typical than of maximum performance with measures of motivation and most facets of personality. It is well conceivable that this is in part due to some methodological factors, given that the above findings are based on only three to five studies each, one of which (Ployhart, Lim, & Chan, 2001) accounts for 71 to 87% of the entire sample size. However, since that study in particular compares the typical versus maximum performance of military recruits across two vastly different types of settings (see section below, Laboratory versus Field Research), it is premature to generalize results as long as we still lack further corroborating results.

If these results hold, however, then it also has wide-reaching implications for the conclusions that one can – or actually cannot draw – about the relevance of motivation in typical versus maximum performance situations. As an example, Klehe and Latham (2006) had reversed the arguments underlying the typical versus maximum performance distinction to address the constructs underlying structured interviews. The original authors of the two most dominant structured interview-formats had argued that their interview-formats assessed motivation in the form of future intentions (Latham, 1989) or past choices (Janz, 1989), whereas others have argued that these interviews 'just' measure some form of verbal and inductive reasoning or job knowledge (e.g., Janz, 1989; Taylor & Small, 2002). Building on Sackett et al.'s (1988) logic, Klehe and Latham argued that if the interviews measured primarily motivation, they should be better predictors of typical than of maximum performance, but if they measured primarily ability, they should be better predictors of maximum than of typical performance. Post-hoc, these authors were somewhat lucky in their results showing that both future- and past-oriented

interviews predicted typical performance significantly better than maximum performance, suggesting that both interview formats primarily assessed motivational constructs, such as intentions or choices. Had the differences in correlations been non-significant, however, then results would have been far less conclusive to interpret than Sackett et al.'s underlying arguments suggest.

Additionally, motivation and ability stand in constant exchange with one another. For one, motivation such as intentions or choices usually does not happen in a vacuum but is formed on the basis of performers' past knowledge and skills (Klehe & Latham, 2008), and for the other, practice (i.e., high motivation) makes the master (i.e., produces high ability). This also implies, however, that the relationship between measures of typical and maximum performance should be quite a bit higher on complex compared to simple tasks. After all, more complex tasks usually require a greater level of ability also for typical performance. If we think of ability as developing expertise, i.e., as being constrained less by some fixed capacity than by deliberate practice (Sternberg, 1999), it follows that a person's capability to perform a complex task is strongly related to that individual's pre-existing motivation to figure out how to accomplish this task in an effective way. For this reason, high typical performance may even become a prerequisite for high maximum performance for complex tasks – with the result that typical and maximum performance should thus share more common variance and that the distinction between the two may become less clear in settings that require continuous learning and adaptation. In line with such thoughts, Beus and Whitman (2012) found that the average relationship between measures of typical versus maximum performance ($\rho = .42$) is usually stronger for more complex ($\rho = .46$) than for simple tasks ($\rho = .36$). Another consequence of the above arguments is that maximum performance itself is not a static criterion, but likely to rise through maturation or increased expertise (Sternberg, 1999) and to decrease via the loss of cognitive, physical, and perceptual-motor abilities crucial to job performance (Fleishman & Reilly, 1992).

Methodological Moderators to the Correlation between Measures of Typical and Maximum Performance

This brings us to the study of moderators to the typical versus maximum performance distinction. Interestingly enough, most of the remaining moderators studied are methodological rather than

conceptual in nature, focusing on issues such as the objective versus subjective nature of the performance criterion addressed and the study's setting.

Regarding criteria, typical versus maximum performance has been studied on physical, psychosocial and administrative tasks, assessed subjectively as well as objectively. Beus and Whitman (2012) argued that the criterion deficiencies and poor reliability of objective performance criteria might attenuate the relationships found between objective measures of typical and maximum performance, an idea that was supported by smaller relationships between objective indicators of typical and maximum performance ($\rho = .37$) than between subjective indicators ($\rho = .45$).

Further moderators studied address the length of assessment under both typical and maximum performance conditions and the time-lag between those two assessments. Sackett et al. (1988) stated that maximum performance episodes should be short enough for performers to stay focused on the task and exert maximum effort (Sackett et al., 1988), without specifying an appropriate time-frame. This ambiguity led to a striking variance between studies in the treatment of the criterion 'short time period'. Maximum performance periods ranged from 5 minutes to 5 days and typical performance periods from 15 minutes to several months (see Table 4.1).

What has up-to-now received too little research attention is the development and distribution of performance over time also under maximum performance conditions. One noteworthy exception is the study of Klehe and Anderson (2007a), in which they assessed the level of effort over time during both typical and maximum performance episodes, finding a decline in effort during the 45 minute typical but not during the 5 minute maximum performance period. However, we still do not know whether performers stay completely focused on the task even during longer maximum performance periods. More specific research is needed to determine the point in time at which fatigue leads to a reduction of effort (Locke et al., 1978) and performance or the predictive value of cognitive and noncognitive performance predictors changes (Sackett, 2007). So far, we still lack enough data-points to render meaningful results, leaving us with nothing but non-significant tendencies at this stage (Beus & Whitman, 2012).

To a large extent, this lack of findings is a direct consequence of a major shortcoming of the current literature on typical versus maximum performance, namely that the empirical study of the typical–maximum performance distinction falls significantly short of the numerous implications proposed. Considering this scarce research base, Sackett (2007, p. 181) acknowledged 'that

Sackett et al. contributed to the relatively slow rate of work on this issue by presenting an imposing set of conditions for an appropriate comparison of typical and maximum performance measures'.

More specifically, Sackett et al. argued that in order to present a clean comparison between any measures of typical and maximum performance, these measures should be both

- a reliable and comparable in
- b the modality of measurement (using the same measurement source and standard),
- c the level of specificity (e.g., speed of performance in both instances, rather than speed of performance in one instance and a global performance in another),
- d the time of assessment in an individual's job tenure.

The goal of these requirements is to exclude alternative possible explanations for any differences found between typical versus maximum performance conditions but for participants' knowledge of being evaluated, their acceptance of instruction to invest effort, and the time duration (Sackett et al., 1988). In practice, however, these criteria, logical as they sound, turn out to be a true challenge and 'studies in field settings generally do not meet these conditions' (Sackett, 2007, p. 181). Moreover, meeting Sackett et al.'s. criterion concerning the duration of typical versus maximum performance situations might influence the reliability of typical versus maximum performance measurement. In most studies, assessments of maximum performance are considerably shorter than assessments of typical performance and thus present a 'shorter' test. In line with the Spearman–Brown formula (Stanley, 1971), one would thus also expect a lower level of reliability. At the same time, people can remain focused on the task over this shorter evaluation period, leading to a lower within-person-variability, which again fosters the ratio of between-person-variability compared to the within-person-variability and thus the reliability (Stanley, 1971). The meta-analysis of Beus and Whitman (2012) suggests that typical and maximum performance measurements overall do not show a very high, but comparable reliability; the mean of the reliability distribution is .81 ($SD = .13$) for typical performance and .75 ($SD = .10$) for maximum performance.

However, future research needs to determine more exactly which factors influence the reliability of measurements of typical versus maximum performance, as in past studies the difference in reliability ranged from .00 to .37 (for more detailed information regarding the measurement of typical and maximum performance, see Table 4.1).

Table 4.1 Operationalization of typical versus maximum performance in earlier studies

<i>Study</i>	<i>N</i>	<i>Performance measures</i>	<i>Performance description</i>	<i>Study setting</i>	<i>Reliability – typical performance</i>	<i>Reliability – maximum performance</i>	<i>Timeframe – typical performance</i>	<i>Timeframe – maximum performance</i>
DuBois et al. (1993)	645	Objective	Cashiering scanner register	Field	Accuracy .91/Speed .96	Accuracy .91/Speed .85	4 consecutive 1-week periods	6 carts
DuBois et al. (1993)	645	Objective	Cashiering electronic register	Field	Accuracy .92/Speed .91	Accuracy .60/Speed .89	4 consecutive 1-week periods	6 carts
Klehe & Anderson (2007a)	138	Objective	Price reporting	Laboratory	.75 (typ. t1) / .67 (typ. t2)	.69	45 minutes	5 minutes
Klehe et al. (2007)	92	Subjective	Oral presentation	Laboratory	.66 (content) / .92 (communicative quality)	.63 (content) / .97 (communicative quality)	15 minutes	15 minutes
Klehe & Latham (2006)	167	Subjective	Teamplaying behavior	Laboratory	.96	.96	4 consecutive months	5 days
Lim & Ployhart (2004)	39	Subjective	Combat proficiency	Field (military)			3 month	1 day
Marcus et al. (2007)	151	Subjective	Managerial performance	Field			1 year	2 days
Ployhart et al. (2001)	1259	Subjective	Leadership behavior	Field (military)			3 month	2 days
Sackett et al. (1988)	635	Objective	Cashiering proficiency	Field	Accuracy .84/Speed .95	Accuracy .47/Speed .82	4 consecutive 1-week periods	6 carts
Sackett et al. (1988)	735	Objective	Cashiering proficiency	Field	Accuracy .86/Speed .86	Accuracy .52/Speed .87	4 consecutive 1-week periods	6 carts
Witt & Spitzmüller (2007)	96	Subjective	Performance aspects of programmers and workers in a cash vault	Field	.93 (task-related behavior) / .90 (OCB)	.93 (ability aspects of perf.)	1-week periods	1-week periods
Witt & Spitzmüller (2007)	181	Subjective	Performance aspects of programmers and workers in a cash vault	Field	.93	.90		

Laboratory versus Field Research

A major challenge particularly in field settings is that the typical and maximum performance situations compared may differ on more than just their evaluative nature and duration. For example when comparing pilots' typical performance with their performance in a maximum-performance flight-simulator (Smith-Jentsch, Jentsch, Payne, & Salas, 1996), it is important to note that flight-simulations usually do not mirror pilots' average flight but rather particularly challenging or even dangerous situations that warrant special practice. Similar cases could be made about many other occupations (doctors, firefighters, soldiers, etc.). Here, the dominant distinction may be far less between instances of typical and maximum performance than between performance during typical versus crisis situations. Even Sackett et al.'s (1988) own results may in parts be less a function not of typical versus maximum performance per se, but of varying job demands between these situations. During a typical performance period, which oftentimes also includes slow periods, speed of processing items might be less indicative of good cashier performance than, for example, establishing friendly interpersonal relationships with customers.

Therefore, a clean comparison between performance under typical versus maximum performance conditions requires the task performed to be fully comparable as well – a requirement that may not even be feasible in many occupations. Some studies on typical versus maximum performance even make explicit usage of different task requirements under typical versus maximum performance conditions. Building on the finding that agreeableness, openness, and extraversion correlate with transformational leadership (Judge & Bono, 2000), Ployhart et al. (2001) argued that transformational leadership would be more relevant under maximum than under typical performance conditions – resulting in higher criterion-related validities of these personality dimensions for transformational leadership under maximum conditions. For testing their assumptions, they decided to compare the transformational leadership of army recruits within a two-day assessment center organized to actually assess leadership skills (maximum performance situation) with their transformational leadership performance throughout their basic military training. This basic training, in turn, mostly aimed at improving the recruits' physical fitness (typical performance situation). The consequence of this set-up was that performers faced explicitly different situations and tasks under the typical and maximum performance conditions, introducing differences other than the

three motivational conditions to the comparison between the typical and maximum performance situations.

In order to prevent any such sources of contamination and to thus secure a high internal consistency, other scholars turn to laboratory settings (Klehe & Anderson, 2007a; Klehe et al., 2007). In these settings, participants complete the exact same task under standardized and controlled conditions that only differ in line with targeted manipulation (e.g., monitored versus unmonitored, timed versus untimed), thus guaranteeing the creation of effectively parallel situations of typical and maximum performance under controlled conditions. Despite Sackett and Larson's (1990) concern that laboratory studies allow only the assessments of relatively maximum rather than of typical performance, laboratory findings (Klehe & Anderson, 2007a) supporting Sackett et al.'s (1988) assumptions suggest the viability of such an approach. Possibly also due to the lack of alternative possible explanations confounding results, laboratory studies usually yield stronger links between assessments of typical versus maximum performance ($p = .59$) than are found in field or military settings ($p = .35$; Beus & Whitman, 2012). Yet, Sackett (2007, p. 181) correctly notes that 'although the effects of varying these conditions can be examined, the "performance over the long term" aspect of typical performance is not amendable to study in short-duration lab studies'. In other words, while internally valid, laboratory studies may fall short in terms of external validity to the organizational context.

A Final Methodological Concern: The Frequent Absence of a Manipulation Check

In the end, typical versus maximum performance situations represent a continuum (Sackett et al., 1988) and any comparison between the two is relative. Potentially more troublesome, however, is that only few field (Klehe & Latham, 2006) or laboratory (Klehe et al., 2007) studies on typical versus maximum performance include even a basic manipulation check, empirically testing whether the 'more typical' and the 'more maximum' performance situations truly differ in their perceived evaluation, instruction, and duration.

In order to remedy this problem, Klehe and Anderson (2005) developed the typical–maximum performance scale (TMPS), a scale to distinguish the degree to which a situation is perceived as rather typical or maximum. The TMPS encompasses six dimensions: The three situational

criteria of (a) knowledge of evaluation, (b) instructions to maximize effort, and (c) perceived duration, and the three motivational consequences (d) direction, (e) level, and (f) persistence of effort. The subscales generally show decent internal consistencies and distinguish well between typical and clearly maximum performance situations, while being unaffected by gender, age, cognitive ability, and most facets of personality.

Yet, even a manipulation check using the TMPS does not preclude the existence of alternative possible explanations that may account for found effects. Thus, a more comprehensive manipulation check would not only include the proposed differences between typical versus maximum performance conditions but would also ensure their comparability in regard to the performance objectives and specificities, as well as the measurements' modality and reliability. To our knowledge, only Klehe and Latham (2006) went through the effort to not only argue but actually test whether the criterion used in that study (peer evaluations of teamplaying performance) were comparably important and observable under both the typical and the maximum performance conditions studied. In the end, such manipulation checks are usually feasible and will help greatly in enhancing the certainty with which one can draw meaningful conclusions.

DIRECTIONS FOR FUTURE RESEARCH

Directions That Have Already Been Outlined Previously

About a decade ago, Klehe and Anderson (2005) outlined several directions for future research – many of which are still just as valid today as they were then. For one, they argued for a more refined research agenda in regard to the role of motivation during typical versus maximum performance situations, given that some motivational variables may be particularly relevant during maximum performance situations, such as achievement motivation. A similar case may be made about perfectionism, and here particularly socially prescribed perfectionism, as this motivational variable may trigger people to care more deeply about the evaluative nature particularly of maximum performance situations.

Second, Klehe and Anderson asked for a more refined study of the mediators and moderators causing any difference resulting from typical versus maximum performance situations. Already Campbell (1990) questioned whether the

difference between typical and maximum performance was solely a function of motivation being variable in situations of typical performance but being constrained in situations of maximum performance. The above-mentioned results on choking under pressure (Baumeister, 1984; Masters, 1992) and impaired performance under maximum performance conditions (Klehe et al., 2007) suggest that factors such as self-focused attention and state-anxiety may play an important role in participants' reactions to maximum performance situations, much more than to typical performance situations. Consequently, performers' self-regulatory skills in handling such self-focused attention and anxiety may be relevant moderators in this regard – yet no research has as of now addressed the role of such skills in the context of typical versus maximum performance.

In a similar line, Klehe and Anderson (2005) questioned whether the assumptions underlying the typical versus maximum performance distinction may hold true also for creative tasks, particularly when it comes to the quality of the creative output (Amabile, 1996). Yet again, past research has up to now not addressed the role of typical versus maximum performance situations on creative tasks.

In parts, a poor response to these calls for research may be due to the generally slow advancement of the typical versus maximum performance field. In parts, however, it may also be due to a lacking integration of such ideas into a wider conceptual framework. Consequently, our final objective of the current chapter is to point at some directions for future research based on insights from major theoretical frameworks in the field. For this purpose, we now approach the typical–maximum performance distinction not only from within but also from the stance of different fundamental psychological theories. In the following, we will introduce three such theoretical approaches, namely VIE-theory, social loafing and facilitation, and self-determination theory.

VIE-Theory

If we utilize classic motivational theories, the typical versus maximum performance distinction can probably be best explained through Vroom's (1964) expectancy-theory (VIE). According to this theory, people will be more motivated to enact a certain behavior (e.g., to work hard), the more they believe that their effort will result in effective performance (expectancy) and that such performance will be rewarded (instrumentality), and the more they value those rewards (valence). The

variable likely most influenced through a change from a typical to a maximum performance situation is instrumentality, the belief that high performance will be rewarded or, alternatively, that low performance will be punished. Typical performance situations create a relatively weak instrumentality per se, making the overall instrumentality dependent on performers' ability to set goals and rewards contingent on the achievement of those goals (that is, to create the missing instrumentality themselves). However, during maximum performance situations, in which performers are cajoled to exert their maximum effort and are assessed precisely on the basis of this effort, the connection between performance and extrinsic rewards becomes rather evident and instills in performers a high degree of motivation.

Social Loafing, Facilitation, and Inhibition

VIE-theory may also be an interesting perspective to take on the typical versus maximum performance distinction, as it has already served to explain effects in the conceptually related literature on social loafing i.e., a person's inclination to expend less effort when operating in groups than when working alone (Karau & Williams, 1993). Like typical and maximum performance, social loafing depends on the evaluation potential inherent in the situation. Latané, Williams, and Harkins (1979) proposed that people only loaf when they think that their performance is not identifiable and thus believe that 'they can receive neither precise credit nor appropriate blame for their performance' (p. 830), and Karau and Williams (1993) confirmed that people engage in social loafing if they feel unaccountable for the outcome, but not if they feel that they can be evaluated for their results. DuBois et al.'s (1993) argument that 'unless one is inviting disciplinary action [under maximum performance conditions], one has little choice but to expend effort on the task in question' (p. 206) follows the exact same logic, suggesting that social loafing will only happen under typical but not under maximum performance conditions.

Karau and Williams (1993) further integrated the extensive literature on social loafing via VIE-theory, showing that loafing usually occurs in the absence of an evaluation, but particularly under certain conditions (e.g., on tasks of low valence or with work groups of low valence). With these results in mind, Klehe and Anderson (2007b) developed a list of scenarios that they asked participants to complete under either typical or maximum performance conditions. Results largely

confirmed that findings from the social loafing literature also hold under typical compared to maximum performance conditions.

Studies on social loafing, however, also indicate that motivation and subsequent performance are not always enhanced by evaluative conditions. More specifically, social loafing and social facilitation share the same underlying processes with social inhibition (Sanna, 1992), with the primary moderator, accounting for different results in highly evaluative situations, being performers' task-related self-efficacy. In presence of high self-efficacy, assessment expectations normally improve or show little effect on performance. With low self-efficacy, however, evaluation expectations impair performers' performance (Bond, 1982; Sanna, 1992; Sanna & Shotland, 1990). Klehe et al. (2007) found comparable effects for typical versus maximum performance: After a manipulation of their task-related self-efficacy, first year psychology students explained topics from one of their lectures to a confederate (typical performance condition) and then explained related topics to the experimenter in the presence of a camera and a microphone (maximum performance condition). The performance of low self-efficacy participants in the maximum performance condition was significantly worse than their performance in the typical performance condition. If on the one hand this is consistent with the aforementioned research on social loafing and inhibition, on the other it is at odds with Sackett et al.'s (1988) original assumptions regarding the effects of typical versus maximum performance conditions.

Conceptually, this implies two things: First, via the conceptual links to the literature on VIE-theory and on social loafing, facilitation, and inhibition, we apparently know more about typical versus maximum performance than the typical versus maximum performance literature itself suggests. Second, the link between situational conditions and resulting performance isn't quite as linear and straightforward as originally proposed. We believe that the literature on self-determination theory could provide another conceptual link to fill the resulting void.

Self-Determination Theory

Sackett et al. (1988) and DuBois et al. (1993) claimed that the typical versus maximum nature of a specific situation has an impact on performers' level of motivation, i.e., the choice of direction, level, and persistence of effort (Campbell, 1990). Yet, typical versus maximum performance situations might not only alter performers' level, but also the type of motivation (Deci et al., 2001; Ryan

& Deci, 2000). Self-determination theory (SDT) (Deci & Ryan, 1985; Ryan & Deci, 2000) proposes (besides acknowledging the possibility of amotivation, i.e., nonexistent motivation) a continuum ranging from an externally regulated motivation (people doing things because they have to; the control lies fully external to themselves) via different degrees of internalization (e.g., people do things because they would feel bad if they didn't or because they see them as valuable and important) to a fully autonomous and possibly even intrinsic motivation. During typical performance situations, employees are relatively autonomous in their choices of direction, level, and persistence of effort. Maximum performance situations, instead, compel the three motivational factors to be high (Sackett et al., 1988; DuBois et al., 1993) and the traditional ways, in which this is considered to take place (evaluation, instruction, short duration) are rather extrinsic in nature. In fact, DuBois et al. (1993, p. 206) also noted that 'Unless one is inviting disciplinary action [in maximum performance situations], one has little choice but to expend effort'. SDT tells us that situational factors like surveillance (Lepper & Greene, 1975; Plant & Ryan, 1985) and evaluation (Ryan, 1982) lessen sentiments of autonomy and promote externally regulated, i.e., externally controlled types of motivation. This means that maximum performance situations probably increase performers' situational extrinsic motivation, likely lowering their situational amotivation but possibly also their situational intrinsic motivation (Deci et al., 2001; Ryan & Deci, 2000). As a consequence, the connection observed between variations from a typical to a maximum performance situation and performers' increased direction and level of effort (Klehe & Anderson, 2007a) might be mediated by an enhancement in their externally regulated motivation.

At the same time, this still leaves us with many new questions, such as: When are maximum performance situations truly perceived to be extrinsically regulating – and when are they possibly accepted as a source of valuable information? What happens when the maximum performance situation is over?, i.e., how does a previous maximum performance situation influence performers' subsequent typical performance? Research on questions like these is far from finished.

CONCLUSION

Overall, conceptual links such as noted above are important for two core reasons: For one, they point at the great potential that the distinction between

typical and maximum performance has on informing different areas of our literature, and for the other, the empirical study of typical versus maximum performance itself may thus gain further inspiration from these related literatures. These literatures, therefore, provide us with several ideas for mechanisms (e.g., from SDT and VIE) and moderators (e.g., from social loafing) to the study of typical versus maximum performance. These suggestions are certainly necessary, in light of the scarcity not only of research on typical versus maximum performance, but also of replication of the few existing findings. Given that the distinction between typical and maximum performance is highly relevant for diverse areas of work and organizational psychology, from personnel selection (Boudreau, 1991; Guion, 1991, 1998) to performance appraisal (Campbell, 1990) to research methods (Chernyshenko et al., 2001; Sackett & Larson, 1990), we therefore need such additional research.

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Organizational Citizenship Behaviors – A New Look at an Old Phenomenon at Different Levels

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An organization can secure the efforts necessary to its existence, then, either by the objective inducements it provides, or by changing states of mind. It seems to me improbable that any organization can exist as a practical matter which does not employ both methods in combination. (Chester Barnard, 1938, p. 141)

INTRODUCTION

A long tradition of research in the organization sciences has discussed the phenomenon of discretionary work behaviors that go above and beyond the formal call of duty and that are essential to the effective functioning of the organization. Starting with the early work of some of the pioneers of our academic discipline, the importance of workplace behaviors that ‘lubricate the social machinery of the organization’ (Bateman & Organ, 1983, p. 588) has been recognized, including the work of Barnard (1938), Roethlisberger and Dickson (1939), Parsons (1951), or Katz and Kahn (1966). What all of these early accounts of organizational behavior have in common is the recognition that organizations will not be able to function effectively in the long term if they do not offer a reason

to employees to engage in behaviors that are in the best interest of the organization, even though they are not part of a job description or rewarded by the organization.

With the early work of Organ and his colleagues on organizational citizenship behaviors (Organ, 1977; Bateman & Organ, 1983; Smith, Organ, & Near, 1983), this set of assumptions was elevated to a formal level and led to the development of the construct organizational citizenship behaviors to describe discretionary workplace behaviors that were not prescribed by formal job descriptions, not rewarded by the organization, yet contributing to the effective functioning of the organization in important ways. While originally conceived as a solution to the conundrum of a non-existing effect of job satisfaction on job performance (Organ, 1977), subsequent research on organizational citizenship behaviors has established the construct as one of the most studied phenomena in the organization sciences. Not only has there been a wealth of research on the construct itself, the interest in organizational citizenship behaviors has also led to the development of numerous related constructs that all share the same underlying idea that employees can contribute to the effective functioning of an organization by engaging in behaviors that go beyond formal job descriptions and role expectations. Examples of such related constructs

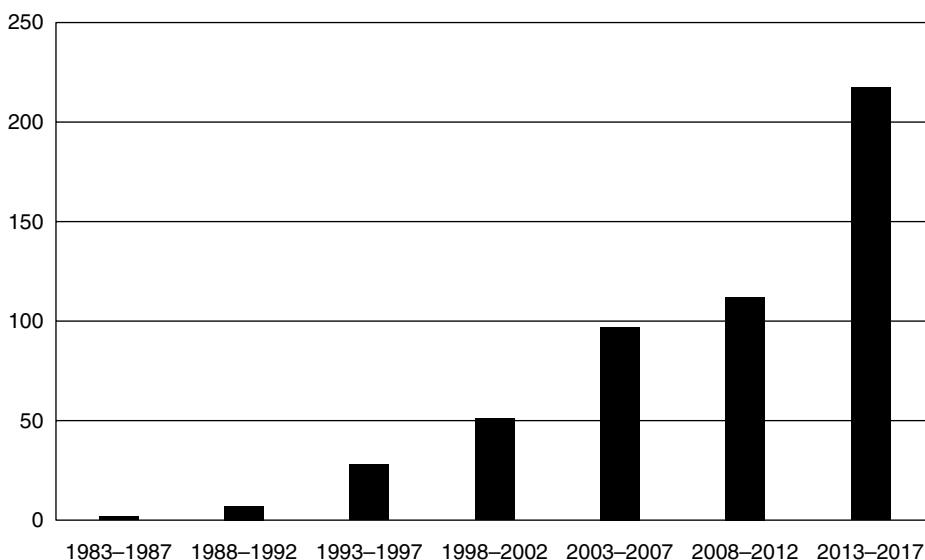


Figure 5.1 Research on organizational citizenship behaviors over time

which have been proposed over the years include altruism, interpersonal helping, courtesy, peace-making, cheerleading, sportsmanship, interpersonal facilitation, loyalty boosterism, generalized compliance, organizational obedience, spreading goodwill, endorsing, supporting, and defending organizational objectives, job dedication, personal industry, organizational participation, job dedication, or protecting the organization, to name just a few of the myriad constructs that have roots in the seminal work of Organ and colleagues.

RESEARCH ON ORGANIZATIONAL CITIZENSHIP BEHAVIORS (OCBS) OVER TIME

As is common for authors of a book chapter on a phenomenon or topic, we were curious to obtain an objective estimate of the interest in the research domain over time, with a particular strong interest in obtaining an objective assessment of the interest in citizenship behaviors and related constructs in the recent past. To do so, we have conducted a literature search in the nine top journals in the field of Organizational Behavior, including *Academy of Management Journal*, *Academy of Management Review*, *Administrative Science Quarterly*, *Journal of Applied Psychology*, *Journal of Management*, *Journal of Organizational*

Behavior, *Organizational Behavior and Human Decision Processes*, *Organization Science*, and *Personnel Psychology*. In our search, we were looking for articles that used the term OCB or citizenship behaviors in the abstract or title of the article and that had a substantive focus on the topic of citizenship. We then organized our results in five-year time spans in which the articles had been published, taking the seminal publications of Organ and colleagues in 1983 as the starting point for our search (Bateman & Organ, 1983; Smith et al., 1983). Figure 5.1 summarizes how interest in the topic of OCBs as evidenced by top-tier publications has developed over time. Consistent with prior observations of related literature reviews (Podsakoff, MacKenzie, Paine, & Bachrach, 2000), we find that interest in OCBs has increased steadily over time, with 28 top-tier publications in the time between 1993 and 1997, 51 publications in the time between 1998 and 2002, 97 publications in the time between 2003 and 2007, and 112 publications in the time between 2008 and 2012. Even more interesting is that the number of top-tier publications on OCBs is about to reach an all-time high, with an estimated 218 top-tier journal articles on OCBs or citizenship in the period between 2013 and 2017 (this estimate was obtained by counting the number of published top-tier journal articles between 2013 and 2014, then extrapolating this trend for the remaining three years of this five-year time span). Not only does this number of 218 top-tier journal articles reflect

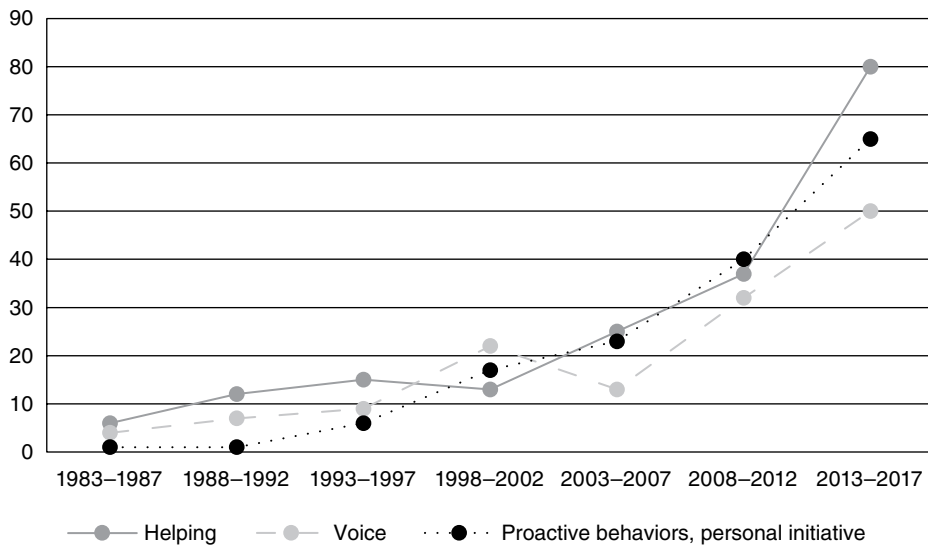


Figure 5.2 Research on helping, voice, and proactive work behaviors over time

the continued interest in the topic of OCBs, it also departs from what might appear as a first sign of decline of interest in the topic of OCBs in the period between 2008 and 2012 in which we have seen a slower growth in top-tier journal publications on OCBs compared to previous time spans. In summary, research on OCBs is alive and well.

Apart from obtaining an estimate in the number of top-tier publications on OCBs, we were also interested in gauging the interest in constructs that share a similar intellectual history, thereby answering the question whether other discretionary work behaviors have taken a more or less prominent role in the research domain when compared to OCBs. Specifically, we were interested in how research on helping behaviors (and related constructs, such as prosocial behaviors or altruism), voice behaviors, and proactive work behaviors/personal initiative has developed over time. We chose these constructs as they (a) represent the most studied discretionary workplace behaviors apart from OCBs, (b) have been anchored both conceptually and empirically in relation to OCB, and (c) have enjoyed widespread popularity especially in recent years. Conceptually similar to organizational citizenship behaviors, helping behaviors have been described as affiliative and promotive discretionary workplace behaviors (Van Dyne, Cummings, & McLean Parks, 1995). What separates the two constructs is the focus on the individual as a beneficiary (while OCBs can contain both individuals and the organization as a whole as beneficiary) and the notion that helping behaviors

do not always have to be in the best interest of the organization. What might help one person at one point in time may actually run counter to the interests of the organization as a whole (Van Dyne et al., 1995). Voice behaviors and proactive work behaviors/personal initiative constitute challenging and promotive discretionary work behaviors. Empirical evidence suggests that voice should best be conceptualized as a form of proactive work behaviors (Parker & Collins, 2010) as both types of behavior focus on bringing about change in an organization, either by speaking up (voice) or by adopting a self-starting approach to work, persevering in the face of obstacles (proactive work behaviors).

We note that our article coding was not mutually exclusive since articles could be relevant to OCB, helping, voice, or proactivity research at the same time. To obtain an estimate of the popularity of the constructs, we have again counted the number of top-tier publications in the nine top-tier journals in our field from 1983 to 2017, organized in five-year time spans. The results of this literature search are summarized in Figure 5.2. For helping behaviors, we see that an early growth in publications on the topic has led to what might be perceived as a stagnation in the years between 1998 and 2002, in which only 13 top-tier journal articles have been published on helping behaviors. Interestingly, however, there is a strong increase in publications more recently, with the highest growth in projected top-tier journal publications for the years 2013–2017. Similar to what we observed

for helping behaviors, interest in voice seemed to face stagnation in the first decade of this century, with only 13 top-tier journal articles published on the topic between 2003 and 2007. But since then, we have seen an impressive growth in publications on voice behaviors, culminating in an expected 50 top-tier publications on the topic between 2013 and 2017. Finally, for proactive work behaviors, we see a much slower start than for the other constructs which we have considered in this review. Given that proactive work behaviors have seen a more recent induction into the field, this comes as no surprise (Bateman & Crant, 1993). Starting with the new millennium, however, interest in proactivity has really taken off, with an expected 65 journal publications on the topic between the years of 2013 and 2017.

The trends which we just described raise three intriguing questions. First, what continues to nurture interest in the topic of OCBs and what has sparked the sharp increase in publications on OCBs in recent years after it seemed that the research domain had entered a stage of maturity or even stagnation? Second, given the continued interest in OCBs as a whole, what can explain the parallel rise in top-tier publications in related constructs such as helping, voice, or proactivity, and are the questions asked for these constructs of a different nature than the ones traditionally asked in OCB research? Third, have the theoretical perspectives and frameworks in research on OCBs and related constructs changed in recent years?

The remainder of this chapter tries to answer these questions. First, we will describe how the conceptualization of OCBs and related constructs has changed over time and how this change can explain the renewed interest in the topic of OCBs. Second, we will show how new theoretical lenses have been adopted to study the antecedents of OCBs, consequences of OCBs, and the social context in which OCBs are performed. These new perspectives add richness and theoretical rigor to a field of study that has at times been characterized as atheoretical (Van Dyne et al., 1995). Our main argument that we will put forth in this chapter is that OCB research has greatly benefited from adopting a multilevel perspective, thereby recognizing how the nature, antecedents, and consequences of OCBs change as we transcend from the within-person, to the between-person, to the group- and to the organizational level. Third, we will review what we view as the most important developments in research on OCBs at these different units of analysis, drawing from both theoretical and empirical work on organizational citizenship behaviors. We will conclude with an agenda of future research on OCBs.

ORGANIZATIONAL CITIZENSHIP BEHAVIOR RESEARCH 2.0 – THE COMING OF AGE OF A CONSTRUCT

Changes in Conceptualizations of Organizational Citizenship Behaviors

Research on OCBs has seen a great deal of energy and journal space dedicated to resolving some long-standing debates on the nature of OCBs. It even seemed for some time as if the research domain would be permanently paralyzed because of disagreements on how OCBs should best be conceptualized and measured. Some of the most important debates concerned whether OCBs should best be conceptualized as in-role vs. extra-role behaviors (Van Dyne et al., 1995), whether OCBs should be restricted to more mundane behaviors that are affiliative and promotive in nature or also include more challenging and preventive forms of discretionary workplace behaviors (Organ, 1997; Van Dyne et al., 1995), and whether the construct was multidimensional or unidimensional (LePine, Erez, & Johnson, 2002).

Fortunately, research on OCB has been able to settle these long-standing debates that have plagued the research domain since its inception, thanks in large part also to the efforts of Dennis Organ himself, who took a clear stance on redefining the nature of OCBs and its construct boundaries (1997), and to theoretical frameworks that have helped organize the research domain (Van Dyne et al., 1995; Griffin, Neal, & Parker, 2007). Nowadays, there is a consensus that the distinction between in-role and extra-role behaviors is not a defining feature of OCBs and that both in-role and extra-role behaviors can be suitable for the performance of OCBs. In addition, Farh and colleagues (Farh, Earley, & Lin, 1997; Farh, Zhong, & Organ, 2004) have shown substantial cross-cultural differences in the meaning of OCBs by developing a measure of OCBs specifically for a Chinese context. They found that employees in China consider behaviors toward the self (e.g., self-training, taking initiative) as well as behaviors toward the entire society (social welfare participation) as forms of organizational citizenship behavior. These findings show that citizenship behaviors can emerge in different forms and behavioral patterns in different cultural and national backgrounds.

Similarly, following the important theoretical work of Van Dyne and colleagues (1995), there is a consensus that OCBs should best be viewed as affiliative and promotive workplace behaviors, as opposed to a challenging or prohibitive behavior. Finally, we have seen a consolidation within the research domain such that more research has

started to focus on OCBs as a whole, with less attention being given more recently to subdimensions of OCB such as altruism, courtesy, sportsmanship, conscientiousness, or civic virtue. With very few exceptions, the only remaining consideration of subdimensions of OCBs is a theoretically derived differentiation between OCBs targeted at individuals or the organization (Williams & Anderson, 1991). This consolidation in perspectives on OCB research has certainly helped set the ground for the recent spark in interest in the topic. Indeed, as Schwab has argued vigorously (1980), consensus on construct meaning is essential for a research domain to progress. Now that most conceptual issues have been resolved, OCB research can truly live up to its full potential. Similarly, by drawing clear construct boundaries, OCB research has paved the way for the induction of new constructs that are both conceptually and empirically distinguishable from OCBs. In fact, by recognizing that OCBs are affiliative and promotive behaviors, constructs such as proactive work behaviors, voice, and personal initiative could gain ground as behaviors that challenge the status quo. Given the preponderance of decentralized work structures, the widespread use of self-managing teams in organizations, and the need for organizations to foster creativity and innovation, these constructs have certainly grown in importance, complementing the more traditional discretionary workplace behaviors such as OCBs and helping behaviors.

Antecedents and Consequences of Organizational Citizenship Behaviors

In 2008, we have provided a review of research on antecedents and consequences of OCBs, discussing dispositional antecedents (e.g., agreeableness and conscientiousness), attitudinal antecedents (e.g., job satisfaction, organizational commitment, or perceived organizational support), and motives (prosocial motives, organizational concern, impression management) as key drivers of OCBs (Spitzmuller, Van Dyne, & Ilies, 2008). Similarly, we discussed research on consequences of OCBs for individual, group, and organizational performance. We urged future research to move beyond performance implications of OCBs and to investigate the effects of OCBs on personal well-being, personal development, self-evaluations, and physical and mental health. We suggested that research should take a closer look at possible negative consequences of OCBs.

Since 2008, our understanding of antecedents and consequences of OCBs has taken a big step forward. Not only have we improved our

understanding of the role of dispositions and attitudes as antecedents of OCBs, we have also developed a much better understanding of the mechanisms through which dispositions influence OCBs. For example, Ilies, Fulmer, Spitzmuller, and Johnson (2009) showed in a meta-analytic path analysis that job satisfaction mediated the effect of Agreeableness and Conscientiousness on OCB-Is and OCB-Os, respectively. Similarly, it is commendable that research on OCBs has adopted a much broader conceptualization of the criterion space of OCBs, for example discussing the important role of OCBs for mood regulation (Glomb, Bhawe, Miner, & Wall, 2011; Sonnentag & Grant, 2012). Similarly, our understanding of OCBs as a (negative) predictor of employee withdrawal and unit-level turnover has clearly advanced (Podsakoff, Whiting, Podsakoff, & Blume, 2009). Arguably one of the biggest contributions in research on OCBs over the last decade, however, is the recognition that there are situations in which OCBs can actually be associated with negative consequences (Bolino, Klotz, Turnley, & Harvey, 2013). For example, Barnes and colleagues demonstrated that backing-up behaviors in teams – one form of interpersonally oriented OCBs – can have negative consequences by inducing recipients of help to neglect their own work in subsequent trials of the task (Barnes, Hollenbeck, Wagner, DeRue, Nahrgang, & Schwind, 2008). Another important development in recent years has been a stronger consideration of the social context in which OCBs are performed. This research shows that the consequences of OCB vary markedly depending on features of the task and social environment in which OCBs are performed. For example, OCBs have a stronger effect on unit performance in teams in which task interdependence is high (Bachrach, Powell, Collins, & Richey, 2006; Nielsen, Bachrach, Sundstrom, & Halfhill, 2012).

Organizational Citizenship Behaviors at Different Levels

The studies discussed in the previous paragraph merely serve to illustrate what we view as a larger trend in research on OCBs: The importance of levels in conceptualizing and measuring OCBs, and in modeling OCBs and their antecedents and consequences. Considering different levels in OCB research can elucidate specific aspects of citizenship behaviors that would otherwise go unnoticed. For example, research on OCBs as a means of self-regulation and mood management (e.g., Glomb et al., 2011; Sonnentag & Grant, 2012) has largely relied on studies at the within-person level. By

investigating if, how, and when one person performs OCBs over time, these studies can depict the temporal sequence of actions, cognitions, and affective states that precede and follow the performance of OCBs.

In contrast, investigating the consequences of OCBs on the between-person level can address how individual differences in dispositions, motivations, backgrounds, and roles can have important implications for the performance of OCBs and for the consequences of OCBs. Some individuals may derive positive consequences from engaging in OCBs, whereas others experience negative consequences (Bolino et al., 2013). Similarly, it is possible that individuals have different motives to engage in OCBs and that these motives determine what kind of OCBs the individual performs and how the OCBs are going to be perceived by others. Finally, recent research on OCBs at the group level of analysis leaves no doubt that the social context has important implications for the likelihood with which OCBs are performed and for the consequences of OCBs. Thus, whereas prior research considered OCB as occurring largely in a social vacuum, more recent accounts have started to account for the role of the proximal social context in which OCBs are performed. Modeling the role of the social context of OCBs can be done in a number of different forms. First, the social context can qualify (i.e., moderate) the effect of OCBs on individual, group, or organizational outcomes (Bachrach et al., 2006). Second, characteristics of the social context can determine if and how OCBs are performed (Pearce & Gregersen, 1991). Thus, the social context can trigger or inhibit OCBs. Third, recent research has also alluded to the possibility that the performance of OCBs in social settings cannot be captured by traditional measures of individual OCB behavior, forcing us to develop new instruments to capture discretionary work behaviors on the group- or organizational level (Cole, Bruch, & Vogel, 2012; Li, Kirkman, & Porter, 2014; Raver, Ehrhart, & Chadwick, 2012).

To summarize, investigating OCBs at the within-person level can provide answers to the question when are OCBs performed (and why do the same employees engage in OCBs on some days but not on other days) and when do they influence relevant personal outcomes?, investigating OCBs at the between-person level can address the question who performs OCBs and what are the potentially different consequences of OCBs when performed by different individuals?, whereas an investigation of OCBs on the group level gets at the question how does the social context influence the likelihood with which OCBs are performed and the consequences of OCBs for individual, group, and organizational functioning? We note

that there are, of course, additional research questions that can be addressed on each of the three levels. Nevertheless, we believe that the questions that we have summarized here represent the types of questions for which each of the three levels is best suited to provide a compelling answer.

This chapter will be organized around these three levels of OCB research – the within-person, between-person, and group/collective level of analysis. For each level, we will summarize what we view as the most important research developments over the last decade. Much like any review, the decision to include or exclude specific studies has to be subjective. Our main consideration in deciding which research we are going to include in this chapter was whether it has provided a novel perspective on OCBs and whether this perspective was informed by the specific level of analysis that was used to study the phenomenon.

ORGANIZATIONAL CITIZENSHIP BEHAVIORS AT THE WITHIN-PERSON LEVEL

A New Look at an Old Phenomenon on the Within-Person Level

Recent theoretical and methodological advances in organizational behavior have stimulated new questions and research approaches for studying OCBs. That is, researchers have started to question whether the traditional research paradigm focusing on uncovering, for example, what makes some employees engage in more OCBs than others (i.e., explaining between-individual differences in OCB) is sufficient for advancing theory and research on OCBs further. That is, given that both task and contextual performance are composed by behavioral episodes (e.g., Motowidlo, Borman, & Schmit, 1997) that naturally unfold across time during work, recent theorizing and empirical investigation have focused on explaining within-individual fluctuations in OCBs.

Such an approach involves measuring OCBs over time (e.g., measuring daily OCBs for a number of days) and can uncover, for example, why an employee may engage in more OCBs on one day, compared to another day, by studying situational factors (e.g., events, states, experiences) that lead to or facilitate OCB episodes. In essence, this is an idiographic approach for studying behavior at work and involves explaining fluctuations across time (e.g., from day to day) in OCBs. For this, one needs to measure OCBs repeatedly for each participant with a state or daily measure (as opposed to a

trait-like general measure that assesses employees' OCBs in general or over a long period of time).

As an example, one could measure employees' positive affect every day and also their daily OCBs for, say, 10 days. If the sample includes 50 employees and they all provide complete data, the research would have 500 daily measurements of positive affect and 500 OCB scores. The total variance in the 500 OCB scores can be partitioned into between-individual variance (which is the variance between the 50 individual OCB means) and within-individual variance (which is the difference between the total variance and the between-individual variance). For each individual in the sample, one can regress his/her daily OCB score on his/her daily positive affect scores ($N=10$) to obtain an intercept and a slope. Then by averaging the 50 intercepts and the 50 slopes, one would obtain estimates of the within-individual relationship between positive affect and OCB.

Of course such data are typically analyzed with multilevel programs that give pooled estimates of the within-individual intercept and slope, estimates of the residual variance, and so on. Importantly, such multilevel data can also be used to test cross-level associations. Using the example above, one can examine whether Agreeableness, a person-level construct is associated with (a) average OCBs and (b) the strength of the within-individual relationship among positive affect and OCBs. These tests are conducted by including Agreeableness scores at level 2 in the multilevel model and then specifying Agreeableness as predictor of (a) the level 1 intercepts (this is in essence, a cross-level main effect) and (b) the level 1 slopes (this being a cross-level interaction).

Affective Events Theory and OCB Research at the Within-Individual Level of Analysis

An organizational theory that has stimulated such an within-individual approach to the study of OCBs is affective events theory (AET; Weiss & Cropanzano, 1996). According to this theory, events and experiences that unfold at work influence episodic behaviors through the affective states that these events generate (they are 'affective events'). Within this conceptual framework, behaviors most directly influenced by discrete events are those that are more closely related to affective states, or what Weiss and Cropanzano called 'affect-driven behaviors'. AET proponents specifically consider citizenship behaviors to be affect-driven, a view supported by empirical research relating affective constructs to such behaviors (George, 1991; Lee & Allen, 2002).

The first article that, following AET, measured episodic OCBs with an experience-sampling methodology (ESM), was published in 2005 by Miner, Glomb, and Hulin. In their study, Miner et al. used palmtop computers that employees carried around with them during their workday, and asked participants to report their current mood, events, and behaviors four times a day (following a baseline morning survey) at random times during their work (as signaled by the palmtop devices). Concerning OCBs, the authors hypothesized that a more positive hedonic tone (more pleasant mood) should be associated with higher OCB scores within individuals. However, this hypothesis was not supported, possibly because OCB was measured with only two items or because it may be difficult to capture actual OCB episodes as these authors tried (they asked participants to report what they were doing at the moment when they were signaled and they could answer 'yes' or 'no' to the two OCB items). In a later study, Miner and Glomb (2010) examined whether OCBs measured with a similar measure were related to mood (i.e., mood was the dependent variable), but again the relationship was not statistically significant.

Taking a different approach, Ilies, Scott, and Judge (2006) did find that daily positive affect (as well as daily job satisfaction) predicted daily OCB reports within individuals in a study that measured daily OCBs at or near the end of the workday. Furthermore, these authors found that Agreeableness had a cross-level moderating effect on the relationship between positive affect and OCBs, in that the OCBs of those who scored high, rather than low, on Agreeableness did not depend on their positive affect. That is, the high-Agreeableness participants performed uniformly high levels of OCBs across the days of the study, whereas their low-Agreeableness counterparts performed high levels of OCB only on days when they were in a positive mood. In another experience-sampling study, Conway, Rogelberg, and Pitts (2009) did not find a significant main effect of positive affect on OCBs (helping in that study) but they found that positive affect interacted with the Altruism dimension of Agreeableness in predicting OCBs. Consistent with previous between-individual research (e.g., Ilies et al., 2009), Agreeableness and Altruism were positively associated with individuals' average levels of OCBs in these two studies.

After those early studies by Miner et al. (2005) and Ilies et al. (2006), an increasing number of studies examining OCBs within individuals have been conducted. A large proportion of this research has been focused on identifying predictors of within-individual variations in OCBs, to

explain why people engage in more OCBs on some days, compared to other days. Dalal, Lam, Weiss, Welch, and Hulin (2009), for example, also studied affective predictors of OCBs within individuals; in an experience-sampling study (their Study 2) they have shown that positive affect is related to OCB (but not to counterproductive work behavior) whereas negative affect was related to counterproductive work behavior but not to OCBs (and also that OCBs and counterproductive work behaviors were weakly related). The results from Study 1 showed that counterproductive work behaviors are weakly related to OCBs and that affective tone (more pleasant mood) is related to increased OCBs within individuals. On the basis of the differential relationships of positive and negative affect with OCBs and counterproductive work behaviors (Study 2) and the weak within-individual relationship between OCBs and counterproductive work behavior observed in both studies, Dalal et al. concluded that OCBs and counterproductive work behaviors are independent when studied within individuals. Among other predictors that were studied within this stream of research (besides affective states such as positive affect) are various constructs including 'the state of being recovered in the morning' (feeling physically and mentally refreshed; Binnewies, Sonnentag, & Mojza, 2009), sleep quantity (Barnes, Ghumman, & Scott, 2013), and state gratitude (Spence, Brown, Keeping, & Lian, 2014).

Departing from the examinations of the main effects of affect on OCBs, two experience-sampling studies attempted to address the causality issue in the relationship among affect and OCBs. Drawing on the social psychology literature suggesting that seeking social interactions (affiliations with others) is a natural response to stress (Taylor, 1991), Glomb et al. (2011) hypothesized that negative mood would promote social forms of OCB (altruism and courtesy). That is, they proposed that people in negative moods engage in OCBs in order to improve their mood (a mood regulation strategy). Indeed, these authors found that negative mood predicted subsequent enactment of altruism (but not of courtesy), and that both altruism and courtesy were positively associated with subsequent positive mood (courtesy was also positively related with subsequent negative mood). In another experience-sampling study, Conway et al. (2009) examined reciprocal effects among positive affect and helping in a sample of 83 employed adults. Although they did not find significant main effects in either direction, they found moderated effect by dispositional altruism in both directions (i.e., there were positive relationships among

positive affect and helping in both directions for participants scoring low on altruism).

OCBs have also been examined through a social comparison lens. That is, Spence, Ferris, Brown, and Heller (2011) proposed that downward comparisons and upward comparisons influence positive affect positively and negatively, respectively, and that positive affect, in turn, influences daily OCBs. These authors tested their hypotheses in a two-week experience-sampling study of 99 full-time employees from a diverse set of occupations in Canada. The results of this study indicated that although downward and upward comparisons did not have overall direct effects on OCBs, these social comparisons did have indirect effects (negative and positive, respectively) through positive affect, as hypothesized.

Rodell and Judge (2009) combined AET and the transactional model of stress (Lazarus & Folkman, 1984) in examining the effects of stressors on OCBs (and counterproductive work behaviors) through discrete emotions. In a two-week long experience-sampling study of 100 individuals, Rodell and Judge found that challenge stressors had offsetting indirect effects on OCBs through attentiveness (a positive indirect effect) and anxiety (a negative indirect effect), whereas hindrance stressors had negative indirect effect on OCBs through anxiety. Examining a stress outcome (emotional exhaustion), Halbesleben and Wheeler (2011), using conservation of resource theory, predicted and found that emotional exhaustion has a positive effect at OCBs targeted at individuals but negative effects on OCBs targeted at the organization (and on in-role performance). The results of this study also indicated that perceived reciprocity moderated these within-individual relationships in that those relationships were stronger for those employees who perceived a lack of reciprocity.

Like Halbesleben and Wheeler (2011), Trougakos, Beal, Cheng, Hideg, and Zweig (2014) also took a resource view of the enactment of OCBs. Anchoring their predictions in ego depletion theory (Muraven & Baumeister, 2000), these authors proposed that emotional labor (surface acting) reduces employees' resource pool (as indicated by emotional exhaustion), thus reducing the likelihood that they would engage in daily OCBs targeted at other individuals. Indeed, their results supported this proposition in that surface acting had an indirect effect on such OCBs through the experience of emotional exhaustion. Results also showed that the within-individual relationship between surface acting and emotional exhaustion was moderated by chronic exhaustion (those who were chronically exhausted were less sensitive to the effects of emotional labor on daily exhaustion).

Future Research on Organizational Citizenship Behaviors on the Within-Person Level

As our review presented above shows, the volume of research on within-individual variations in OCBs has been increasing over the past decade. We believe this trend will continue, because this approach to studying OCBs is nicely complementing the traditional approach that examines between-individual differences in OCBs while also having the potential to make unique contributions to organizational theory and research. We see the possibility of such unique contributions in several areas, as follows. First assessing daily (or momentary) OCBs multiple times can uncover the influence of discrete events and experiences on the occurrence of OCBs. We believe more research is needed in this area and more complex within-individual models of OCBs can be tested. Second, the within-individual approach to studying OCBs can examine person–situation effects via cross-level interactions as explained above (see, for example, Ilies et al., 2006 and Conway et al., 2009). Third, we believe that examining the role of OCBs in the stress process within individuals has the potential to elucidate when OCBs have a stressful influence on employees (e.g., perhaps when workload is high, performing OCBs depletes resources further) and when OCBs have positive influences (e.g., perhaps buffering the effects of stressors through fulfilling employees' social needs). Also, within-individual studies are best positioned for studying the links between discrete emotions and OCBs in a naturalistic environment. A study by Ilies, Peng, Savani, and Dimotakis (2013) showed that induced guilt has functional properties by stimulating OCBs with a randomized field experiment design. We believe experience-sampling research can test such effects within individuals, and can further contribute to theory on emotions and OCBs.

ORGANIZATIONAL CITIZENSHIP BEHAVIORS AT THE BETWEEN-PERSON LEVEL

A Broader Look at Antecedents of OCBs and the Criterion Space

Traditionally, most of OCB research has been conducted at the between-person level, investigating dispositional and attitudinal antecedents of OCBs and the consequences of OCBs for individuals

who perform OCBs. This research builds on the insight that not all individuals have the same motivation to engage in OCBs, and that these different motives may in turn determine the consequences of engaging in OCBs. Restated, engaging in OCBs can serve different functions for individuals, which may in turn have implications for the consequences of engaging in OCBs. Among the first to suggest that engaging in OCBs can serve very different functions for individuals were Rioux and Penner (2001), who showed that three distinct motives – altruistic orientation, organizational concern, and impression management motives – could all drive citizenship behaviors. Again recognizing the different motives that can underlie OCBs, Bolino (1999) argued that audience perceptions of the motives that trigger OCBs determine their consequences. According to Bolino, only those citizenship behaviors that are viewed as driven by genuinely prosocial motives such as social exchange considerations or a favorable personality and disposition would lead to the positive image of a good organizational citizen. By contrast, audience perceptions of OCBs as being motivated by impression management would neutralize the positive role of OCBs such that OCBs would be associated with no higher work group performance and not lead to the image of a good organizational citizen. Similar results have been reported by Eastman (1994), who found that rewards for OCBs were lower when OCBs were viewed as ingratiation and not as genuine. In fact, individuals who engaged in OCBs that were viewed as ingratiation received even less rewards than individuals who did not perform any OCBs at all. This finding has been replicated in different studies and settings by Allen and Rush (1998) and Johnson and colleagues (Johnson, Erez, Kiker, & Motowidlo, 2002). Unfortunately, however, more recent research has not followed into the footsteps of this early research on motives to engage in OCBs and how these motives determine the consequences of OCBs.

An important contribution to research on consequences of OCBs at the between-person level comes from Bolino and colleagues, who showed in a series of studies that engaging in OCBs can actually be associated with negative consequences for some individuals (Bolino et al., 2013). For example, individuals who engage in individual initiative – one form of OCB – are more likely to experience role overload, job stress, and work–family conflict, an effect that was particularly pronounced among women (Bolino & Turnley, 2005). Some employees can also experience a phenomenon referred to as citizenship pressure in which they experience a social expectation to engage in more OCBs, which is associated with

higher work–family conflict, work–leisure conflict, job stress, and turnover intentions. This effect was especially pronounced for unmarried employees and for employees with low conscientiousness (Bolino, Turnley, Gilstrap, & Suazo, 2010). Similarly, performance of OCBs has been linked with lower job satisfaction for individuals with low levels of optimism (Munyon, Hochwarter, Perrewé, & Ferris, 2010). These studies show that the consequences of OCBs do not materialize uniformly across actors, but that motives to engage in OCBs, personality traits, gender, and background characteristics determine if and when OCBs are associated with positive consequences.

In a theoretical piece, Flynn (2005) also alluded to the important role of identity orientations in determining if, how, and when individuals will engage in OCBs. According to Flynn, identity orientations can explain why one individual will only reciprocate favors to a selected group of peers, whereas other individuals will show such acts toward all members of a given group. Specifically, Flynn argued that individuals with a personal identity orientation, view social exchange relationships from a very instrumental perspective, motivated by the desire to increase personal benefits. As such, individuals with a personal identity orientation negate reciprocal or generalized exchange systems in which the exchange terms remain unspecified and in which trust between participants of social exchange is required to maintain the system of ongoing exchanges. By contrast, individuals with a relational orientation accept the implicit nature of reciprocal exchange relationships, but still expect direct reciprocation of the beneficiary of one personal act of favor/OCB. The focus of individuals with a relational orientation is on satisfying self-interest and the interest of relevant social others with whom social exchange relationships have been initiated. Finally, individuals with a collective identity orientation do not only accept the implicit nature of exchange terms between participants of social exchanges, they also adopt a broader perspective on who is considered part of a social exchange relationship. Contrary to the narrow definition of social exchange relationships in negotiated and reciprocal exchange systems, individuals with a collective identity orientation view all group members as legitimate participants of social exchanges. This implies a direct obligation to perform OCBs to any group member, irrespective of the likelihood with which the specific recipient will reciprocate the OCB in the future. Thus, individuals with a collective identity orientation prefer generalized exchange systems because they maximize group interests and welfare over the interest of individual actors. Unfortunately, up to this point, Flynn's theoretical framework has not been tested empirically.

Nevertheless, we view it as an important contribution to OCB research because it exemplifies how different individuals construe OCBs in a different way, with important implications for the way in which OCBs are enacted and how they shape the web of social relationships in collective settings.

Given the available evidence on different motivations as drivers of OCBs and how these different motives lead to different consequences for OCBs, it is surprising that there is almost no research that investigates the possibility that different motives to engage in OCBs are also associated with different forms of OCBs. A recent article by Kim and colleagues (Kim, Van Dyne, Kamdar, & Johnson, 2013) presents a noteworthy exception. In two field studies, the article shows how different motives to engage in OCBs are associated with different types of OCBs (prosocial motives and impression management motives were associated with helping-OCBs, whereas organizational concern motives was associated with voice-OCBs). Further expanding on the association between motives to engage in OCBs and different types of OCB behaviors, Spitzmuller and Van Dyne (2013) posited in a theoretical article the existence of two distinct motivational orientations toward helping behaviors which in turn shape the nature and the consequences of helping behaviors. Specifically, they differentiate between proactive helping and reactive helping. Proactive helping is driven by functional motives to engage in helping behavior. Thus, proactive helping is ultimately self-interested behavior that seeks to meet the psychological needs of the helper. By contrast, reactive helping is motivated by social exchange considerations and reciprocity norms. What drives the act of helping is not the desire to satisfy functional motives, but a genuine need for help on the side of the beneficiary. The different motivational orientations to these two types of helping behaviors also determine how helping is enacted. According to Spitzmuller and Van Dyne (2013), proactive helping is characterized by a higher temporal stability as the motive for helping continues to exist irrespective of beneficiary and context. Since reactive helping is driven by the legitimate need of others, the need to help stops as soon as the needs of the beneficiary are met. Thus, reactive helping may be of a more intensive nature in the short term, but of a lower temporal stability in the long term as the beneficiary. After discussing the different motivational orientations that underlie proactive and reactive helping, Spitzmuller and Van Dyne (2013) continued to describe different consequences that would be associated with proactive and reactive helping, respectively. Specifically, they argued that proactive helping is associated with positive consequences for the

helper – including reputational benefits, enhanced well-being, self-evaluations, personal development, and need satisfaction. By contrast, reactive helping is primarily associated with positive consequences for the beneficiary and the group in which it is performed such that it creates and perpetuates social exchange norms and facilitates needful relationships among individuals.

Future OCB Research on the Between-Person Level

Thanks in large part to the work of Bolino and colleagues (Bolino, 1999; Bolino et al., 2013; Bolino & Turnley, 2005), there is an emerging consensus in OCB research that the performance of OCBs can be associated with both positive and negative consequences. This, however, questions the long-standing assumption that OCBs should be promoted in organizations by selecting for good citizens and by rewarding OCBs. Thus, it is imperative to improve our understanding of the specific factors that determine when OCBs are going to lead to positive consequences and when they are associated with negative consequences – for the actor, the beneficiary, or the group in which they are performed. We encourage additional theory building and empirical research on the positive and negative consequences of OCBs, with a special focus on the role of dispositional orientations and situational characteristics that can moderate the effect of OCBs on relevant outcomes. We also believe that it is necessary to differentiate between different types of outcomes, instead of assuming that OCBs would be positive or negative per se in one given context. The research of Bergeron and colleagues (Bergeron, 2007; Bergeron, Shipp, Rosen, & Furst, 2013) shows for example that performance of OCBs in outcome-based control systems is positively associated with subjective performance evaluations, but also negatively associated with objective career outcomes such as career progression and salary increases. This finding shows that we need to develop a more fine-grained understanding of the positive and negative consequences of OCBs.

Given the double-edged sword that the performance of OCBs presents for employees in organizations, it is important to develop interventions that can enhance the positive consequences of helping while reducing or eliminating the negative consequences of OCBs. Specifically, how can incentive systems in organizations be designed such that the performance of OCBs does not backfire, neither for the individual who engages in OCBs, nor for the group in which OCBs are performed. Developing

reward systems that encourage or discourage OCBs per se would certainly be short-sighted. Instead, what is needed is an understanding of the organizational objectives and the extent to which OCBs are instrumental in securing these. For example, it might be worthwhile to reduce incentives for OCBs in work settings characterized by little task interdependence. By contrast, organizations would do well to incentivize OCBs in settings in which performance of OCBs is costly to the individual, yet highly effective for the organization as a whole, as is the case in outcome-based control systems. Not only should OCBs be rewarded in subjective performance evaluations, they also need to be associated with career progression and salary advancements such that the different incentive components of an organization are aligned with each other.

Another promising avenue for future research would be to investigate how OCBs are best performed so that they are associated with positive consequences. For example, is a one-time, committed act of helping more beneficial for the helper and the beneficiary than a series of short and superficial acts of support? Similarly, when deciding who to target with OCBs, should individuals primarily target the organization as a whole or other employees, and if the latter, which employees are most deserving of OCBs? Which employees would be best equipped to translate an OCB into something valuable for the organization? Answering the question how OCBs should best be performed also requires us to develop more fine-grained measures that can capture the nuances that can determine if and when the performance of OCBs is associated with positive or negative consequences. A promising example here is the ongoing validation of a construct for voice-OCB quality (Raver & Brykman, 2015).

We also encourage additional research on bystanders' reactions to helping behaviors. Attributions of the motives for OCBs determine the consequences of OCBs, but we do know that such attributions of motives do not always have to be correct. Thus, individuals may actually be penalized for performing OCBs when their motives are questioned, even if a genuine prosocial motivation triggered the OCB. This also raises the question if there are some individuals who are best at reading the motives of individuals who engage in OCBs. It could also be possible that there are settings in which motives to engage in OCBs are especially difficult to read. For example, high-stake settings in which the actor has a strong personal interest in a decision or group outcome present a setting in which the motives of the actor are easily questioned. Which cues could be present in such situations that differentiate good actors from good soldiers?

ORGANIZATIONAL CITIZENSHIP BEHAVIORS AT THE COLLECTIVE LEVEL

From Collective OCBs to Collective Performance

Our understanding of OCBs would be incomplete without considering the consequences of OCBs on the collective level. Indeed, Organ defined OCB as behavior that ‘in the aggregate promotes the effective functioning of the organization’ (Organ, 1988; p. 4). Organ (1988) also proposed that OCBs enhance the effectiveness of a focal group, unit, and organization. Despite the intuitiveness of this proposition, it took some time until this proposition was tested empirically (Borman & Motowidlo, 1993; Organ & Konovsky, 1989). Since then, there has been a growing stream of research investigating the relationship between collective OCBs and collective performance. For example, Podsakoff and colleagues (Podsakoff, Ahearne, & MacKenzie, 1997; Podsakoff & MacKenzie, 1994) found that the performance of collective OCBs was associated with higher collective performance. Interestingly, however, some findings on the relationship between subdimensions of OCBs and collective performance qualified this finding. First, Podsakoff and MacKenzie (1994) found a negative relationship between unit-level helping behaviors – one component of OCBs – and unit performance. Second, Podsakoff et al., (1997) found that civic virtue did not predict the quantitative and qualitative aspects of group performance, and that sportsmanship was not related to the qualitative aspect of group performance.

These findings point to possible boundary conditions in the relationship between collective OCBs and collective effectiveness. And indeed, Bachrach et al. (2006) found that task interdependence moderated the relationship between group-level helping and group performance; the positive effects of group helping became stronger when task interdependence was high. Again focusing on the moderating role of task interdependence, Nielsen et al., (2012) found that task interdependence exerted a different moderating role in the relationship between subdimensions of OCBs and team performance depending on the specific subdimension under consideration. Specifically, they found that when task interdependence was low, group-level helping and civic virtue negatively influenced team performance, whereas sportsmanship and overall OCB did not significantly influence team performance. All sub dimensions of OCB positively affected team performance when task interdependence was high. Furthermore, Rico, Bachrach, Sanchez-Manzanares, and

Collins (2011) found a three-way interaction effect of person-focused citizenship behavior, task interdependence, and virtuality in predicting team performance. They showed that high virtuality reverses the moderating effects of task interdependence in the relationship between group-level OCB and group performance; when virtuality is high, low- rather than high-task interdependence leads to positive effects of person-focused OCBs on team performance (Rico et al., 2011). Finally, the meta-analysis of Nielsen, Hrivnak, and Shaw (2009) showed that the strength of the relationship between group-level OCBs and group performance is contingent upon the form of measurement, sub dimension in consideration, rating source, and objectivity of performance rating.

In light of these findings, subsequent research continued to investigate the relationship between specific subdimensions of citizenship behavior and group performance. First, Lin and Peng (2010) found different mechanisms through which collective OCB-I and OCB-O enhanced unit performance. In particular, OCB-I increased group cohesion, whereas OCB-O increased collective efficacy, both of which resulted in enhanced unit performance (Lin & Peng, 2010). Second, MacKenzie, Podsakoff, and Podsakoff (2011) investigated the interaction effects of challenge-oriented OCB and affiliation-oriented OCB on work group task performance. They found an inverted U-shaped relationship between challenge-oriented OCB and performance, an effect which was moderated by affiliation-oriented OCB. Specifically, collective challenge-oriented OCB exerted a negative influence on group performance when combined with low levels of collective affiliation-oriented OCB.

Beyond the Simple Sum of Parts: OCB as a Collective Property and Antecedents of Collective OCB

Early studies on collective OCB assumed that collective OCB was merely a sum of its parts. Thus, collective OCBs were measured as an aggregation of individual-level OCBs. Ehrhart was the first one to posit that the construct of unit-level OCB is indeed different from the simple sum of individual-level OCBs. In particular, he defined collective OCB as the ‘normative level of OCB performed within the unit’ (Ehrhart, 2004: p.64). Building on emergent multilevel theorizing (Chan, 1998; Kozlowski & Klein, 2000), they discussed the role of group OCB norms for the performance of OCBs in teams. In addition, Ehrhart, Bliese, and Thomas (2006) showed empirically that unit-level

helping was positively related to various outcomes of unit effectiveness, even after controlling for the effects of other group processes, including group cohesion, conflict, and leadership. Further building on this important early work on unit-level OCBs, Raver et al., (2012) examined the effects of team member composition on the emergence of team helping norms. They found that minimum scores of team members' Agreeableness, other orientation, and helping belief predicted helping-norm emergence. Moreover, they reported indirect effects of maximum scores in team members' agreeableness on helping-norm emergence, mediated by team mean helping behaviors. These results strongly support the notion that research on unit-level OCBs should move beyond treating group-level OCB as the sum of individual-level OCBs. This also implies that there is a need to investigate antecedents of collective OCBs as our knowledge of antecedents of OCBs on the individual level of analysis might not necessarily generalize to the collective level.

Research on group and team studies has also considered collective OCB as an important outcome variable for quite some time. Kirkman, Tesluk, and Rosen (2001) found that team empowerment predicted team OCBs. Erez, LePine, and Elms (2002) also reported significant effects of peer evaluation and rotated leadership on team-level cooperation and voice. De Dreu and Van Vianen (2001) investigated how conflict response styles moderated the relationship between relationship conflict and team functioning, operationalized as team-level compliance, helping, and voice. They found that contending and collaborating response styles were associated with ineffective team functioning, whereas avoiding responses were associated with improved team functioning. Moreover, Raver and Gelfand (2005) examined the effect of sexual harassment on team citizenship behaviors, but they found no significant association between the two in their data.

Given the important status of collective OCBs as a group-level criterion variable, it is not surprising that researchers have investigated possible antecedents of group-level OCBs. Given the collective nature of the construct, many researchers speculated that leadership might play a role in triggering collective OCBs. First, Pearce and Herbig (2004) found that the team leader's encouragement of teamwork increased team-level citizenship behavior. They also reported a significant effect of team commitment and perceived team support on predicting team citizenship behavior. Second, Richardson and Vandenberg (2005) examined the relationship between transformational leadership and work-unit OCBs, an effect which was mediated by involvement climate. In a similar vein,

Menges, Walter, Vogel, and Bruch (2011) showed that positive affective climate mediated the relationship between transformational leadership and collective citizenship behavior. Third, Ehrhart (2004) found that servant leadership predicted unit-level OCB, an effect that was mediated by procedural justice climate. Hu and Liden (2011) replicated the same finding. Similarly, Mayer and colleagues (Mayer, Kuenzi, Greenbaum, Bardes, & Salvador, 2009) showed trickle-down effects of top management ethical leadership on group-level OCBs. Hunter and colleagues (Hunter, Neubert, Perry, Witt, Penney, & Weinberger, 2013) replicated the significant effects of servant leadership on collective OCB and found that service climate mediated this effect in this particular sample from a retail organization. Shin (2012) conducted a firm-level study that investigated the relationship between CEO ethical leadership and firm-level OCBs, an effect that was mediated by ethical climate.

Scholars also focused on the role of collective climate as a predictor of collective OCBs (e.g., Ehrhart, 2004; Hunter et al., 2013; Shin, 2012). Naumann and Bennett (2002) found significant effects of procedural justice climate on various criteria of group performance, including group-level helping, subjective performance, and financial performance. Chen, Lam, Naumann, and Schaubroeck (2005) suggested an integrative model on the antecedents of group-level citizenship behavior, including group leadership, climate, attitudes, goals, and affective factors. Ambrose, Schminke, and Mayer (2013) investigated the effect of supervisor perceptions of interactional justice (i.e., perceptions of how fair their own supervisors have treated them) on group-level OCBs via interactional justice climate. This study is remarkable as it established an effect of justice and fairness perceptions across two levels in an organization. This shows how group-level OCBs are shaped by fairness perceptions in the organization as a whole, and not only by the treatment which a work group receives from their direct supervisor.

Subsequent research investigated other possible antecedents of group-level OCBs, such as group composition and task characteristics, extending the previous focus on leadership and climate factors. Mohammed, Mathieu, and Bartlett (2002) found that the average experience of group members and team member Agreeableness predicted collective contextual performance. Similarly, Choi (2009) established an association between diversity variables (gender, education, and tenure) and group-level helping. Choi and Sy (2010) also established a relationship between group faultlines and group OCBs, an effect that was mediated by intra-group conflict. Finally, Hu and

Liden (2011) showed that team potency mediated the relationship between goal and process clarity and group-level OCB. As we can see from this review of past studies on group-level OCBs, the earlier studies relied mostly on composite scores of team-level characteristics to predict group-level OCBs, whereas later research paid closer attention to specific distribution patterns (e.g., minimum/maximum value, faultline score, interaction effects among these factors, etc.) in antecedents of group-level OCBs.

Collective OCB as a Facilitator for Successful Organizational Functioning

As previously mentioned, OCB facilitates the effective functioning of the organization as a whole (Organ, 1988). Given the nature of OCBs, the phenomenon has also attracted considerable attention from scholars in the field of Strategic Human Resource Management. For example, Koys (2001) conducted a longitudinal study and found that OCB enhanced firm performance, whereas firm performance did not increase OCBs. This finding provides empirical support to the notion of OCBs as facilitator of organizational functioning and performance. Subsequently, scholars have investigated collective OCBs as a potential mechanism that can explain how firm-level inputs, such as HR practices and structure, influence firm-level outcomes including firm performance. First, DeGroot and Brownlee (2006) found that unit-level OCBs mediated the effect of department structure on performance. Second, Nishii, Lepak, and Schneider (2008) examined whether the attributions that employees form to explain why their firm adopted specific HR practices influence unit-level OCBs and customer satisfaction. Consistent with their predictions, they found that such attributions were indeed associated with customer satisfaction, an effect that was mediated by unit-level OCB. Chuang and Liao (2010) investigated the link between high-performance work systems (HPWS) and market performance. They found that HPWS increased concern for employees of the firm, which resulted in enhanced collective helping behavior and ultimately firm performance (Chuang & Liao, 2010). Messersmith and Guthrie (2010) showed that collective job satisfaction, organizational commitment, psychological empowerment, and citizenship behavior mediated the effect of HPWS on firm performance. Finally, Kim and Gong (2009) found that group-based pay increased organizational-level OCB, resulting in better firm performance.

More recently, scholars continued to investigate the association between leadership and unit-level OCBs, this time examining the mediating role of unit-level OCBs in the relationship between leadership variables and firm outcomes. Allen, Smith, Mael, O'Shea, and Eby (2009) showed that organizational mentoring predicted organizational performance and that this effect was mediated by found organizational-level OCB and learning. Ahearne, MacKenzie, Podsakoff, Mathieu, and Lam (2010) examined the effect of empowering leadership on team performance and showed that this relationship was mediated by team potency and team-level helping behavior. Frazier and Bowler (2012) found that group-level supervisor-undermining reduced group performance because it discouraged a voice climate. Finally, Chun, Shin, Choi, and Kim (2013) found that organization-level OCB mediated the relationship between corporate ethics and firm financial performance. In summary, these findings suggest that OCB is an important behavioral mechanism that translates the effects of HR practices, organizational structures, leadership variables, and corporate ethics on organizational outcomes.

Future Research on OCBs on the Collective Level

Based on our review of extant research on OCBs on the collective level, we can draw the following conclusions. First, collective OCB results in higher collective performance. Second, the strength of this relationship is contingent upon the dimension of collective performance, the subdimension of collective OCB, and the form of organizational structure in consideration. Third, as a collective construct, collective OCBs are a function of other group-level phenomena, including leadership, climate, task characteristics, and the composition of groups and organizations. Finally, recent research shows that collective OCBs can illuminate the black box between organizational practices and organizational outcomes.

The aforementioned findings contribute to a better understanding of the nature, antecedents, and consequences of collective OCB. However, the current review also points to important research gaps. First, most studies on collective OCB studied predictors and consequences of collective OCB on the collective level only, with very few studies adopting a cross-level or a multilevel research design. We urge future research to investigate cross-level effects of collective OCBs on individual-level outcomes and whether relationships that have been established on the collective level can

be replicated on different levels of analysis. In two noteworthy exceptions, Bommer, Dierdorff, and Rubin (2007) found that group-level OCB moderated the relationship between individual OCB and performance, and Ng and Van Dyne (2005) showed cross-level effects of cohesiveness, cooperative norms, and conflict on individual-level helping. These results suggest that future studies need to consider collective OCBs as an important contextual factor, exerting both direct and moderating effects on individual-level variables. For instance, it is plausible that high levels of collective OCBs can induce higher levels of individual-level OCBs in organizations and that this effect materializes irrespective of dispositional orientations of individuals. In contrast, if the collective does not endorse OCBs, it is possible that even those employees who are dispositionally inclined to perform OCBs decide not to engage in OCBs (Ehrhart & Naumann, 2004). Also, it would be worthwhile to investigate the cross-level moderating effects of cultural differences on the nature of collective OCB. Indeed, prior studies have found that cultural values change the way of thinking of employees, which may have implications for the performance of OCBs (Euwema, Wendt, & Van Emmerik, 2007; Farh, Hackett, & Liang, 2007). Thus, we encourage future research on the role of cultural differences for the emergence and for the consequences of OCBs at different levels in organizations.

Second, prior studies on collective OCB largely examine only one specific dimension of OCB, such as helping, instead of considering multiple subdimensions of OCB simultaneously. Mackenzie et al. (2011) found support for differential effects of group-level challenge- and affiliation-oriented OCBs on group performance, which attests to the value of considering a more fine-grained approach in investigating the consequences of collective OCBs. In a similar vein, subdimensions of OCB may have different antecedents. For example, it is possible that collective OCB-I would be more strongly driven by interpersonal and group-level factors, whereas collective OCB-O may be caused largely by organizational-level factors that capture the quality of the organization-employee relationship. Moreover, the subdimensions of collective OCBs may have different consequences for individual-level OCBs. For instance, affiliation-oriented OCBs, such as helping, could suppress the emergence of challenge-oriented behaviors on the individual level, such as voice and creativity. Similarly, group-level challenge-oriented OCBs may work against individual-level affiliation-oriented OCBs.

Finally, we suggest that future research on collective OCBs could increase its theoretical depth and precision by adopting theoretical perspectives from related disciplines,

such as sociology and evolutionary psychology. Individual-level OCBs overlap conceptually with helping and prosocial behaviors, which have been studied intensively in psychology. Thus, numerous studies on OCB at the individual level have adopted psychological theories (e.g., Rioux & Penner, 2001; Sonnentag & Grant, 2012). We believe that sociological perspectives can help frame the antecedents and consequences of OCBs at the collective level. For example, social exchange theory (Cook, Cheshire, Rice, & Nakagawa, 2013) and a consideration of different forms of social exchanges (e.g., negotiated, reciprocal, generalized social exchanges; Flynn, 2005; Willer, Flynn, & Zak, 2012) can elucidate aspects of collective OCBs that are not accessible to psychological theories of social exchanges. Specifically, while psychological accounts of social exchange theory have tended to focus on the interpersonal processes of exchange (Cropanzano & Mitchell, 2005), sociological perspectives on social exchange focus on the structural nature of exchange systems and their implications for group processes and outcomes (Lawler, Thye, & Yoon, 2008; Molm, Takahashi, & Peterson, 2000; Willer et al., 2012). Not only do psychological and sociological perspectives on social exchange place a different emphasis on specific aspects of OCBs, they also support research findings that are not always reconcilable with each other. For example, Molm and colleagues (Molm, Collett, & Schaefer, 2007; Molm, Peterson, & Takahashi, 1999; Molm et al., 2000; Molm, Whitham, & Melamed, 2012) reported that generalized exchange systems were superior in facilitating positive interpersonal processes and group outcomes by strengthening a collective identity orientation and embeddedness. In contrast, Lawler et al. (2008) – an example of research that draws on psychological theorizing of social exchanges – found that direct exchange systems (as opposed to generalized exchange systems) resulted in better outcomes by inducing positive emotions in individuals.

Given the conflicting theoretical perspectives and empirical findings, research on collective OCB would do best to selectively combine psychological theories of social exchange with sociological accounts of social exchange systems. While psychological perspectives on social exchange have better precision when discussing individual reactions to social exchanges in a small social network, sociological perspectives can deliver more precision and depth when discussing the emergence and the effects of different forms of social exchange systems in larger social networks.

In a similar vein, the development and stability of group norms and collective OCB norms would be driven by sanctioning systems (Tenbrunsel &

Messick, 1999) and responses of bystanders (who sanction behavior that fails to live up to the norms of a specific social exchange system) (Baumeister & Leary, 1995). In examining these processes on collective OCBs, studies on evolutionary psychology (Fehr & Fischbacher, 2004; Nowak, 2006; Nowak, Sasaki, Taylor, & Fudenberg, 2004) can help in the theory building on collective OCBs. Overall, we believe that the use of sociological accounts of social exchange systems in collectives can help improve our understanding of the nature and consequences of collective OCBs.

CONCLUSION

In this chapter, we have reviewed recent research on OCBs at different levels of analysis – the within-person, between-person, and collective level. Our review shows how each level and perspective can elucidate specific aspects of OCBs that would otherwise go unnoticed. Specifically, research on the within-individual level can best capture the temporal sequence of activities and psychological experiences that trigger and follow OCBs. Adopting a between-person perspective on OCBs can answer the question why some individuals choose to engage in OCBs in a given context and others do not, and what the sometimes different consequences of performing OCBs are. Finally, research on the group level is best suited to explain how the structure of groups, social exchange systems, and team compositions can create norms that can help facilitate or hinder the expression of collective OCBs. As our review of past research on OCB shows, the consideration of different levels in OCB research has led to a remarkable growth in research on OCB. We believe that OCB research on all three levels continues to offer tremendous opportunities for theoretical advancements and fascinating empirical research. We look forward to observing how this body of multilevel research on OCBs will continue to grow in the years to come.

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Counterproductive Work Behaviors

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INTRODUCTION

In every organization, some employees engage in harmful behaviors that detract from organizational effectiveness rather than advancing it. These counterproductive behaviors, which take many forms and can be motivated by a wide variety of factors, greatly impact individuals, organizations, and economies. Although precise data are unavailable and surveys are notoriously deficient, credible conservative estimates place the combined annual impact of various counterproductive behaviors in the billions of dollars for the US alone (see Allen, 1983; Bennett & Robinson, 2000). Estimates of the impact of narrow forms of these behaviors further illustrate their detrimental effects; employee retail theft alone results in estimated losses of \$41 billion worldwide annually (Centre for Retail Research, 2011), and the median loss associated with each incident of employee fraud is \$150,000 (Association of Certified Fraud Examiners, 2016). These staggering estimates only account for a small proportion of employee counterproductivity. Their costly effects extend beyond the obvious financial considerations (e.g., lost productivity and resources), also impacting the psychological and physical well-being of employees, coworkers, customers, and other stakeholders (e.g., Bowling & Beehr, 2006;

Mackey, Frieder, Brees, & Martinko, 2015; Schyns & Schilling, 2013).

Counterproductive work behaviors (CWB; also termed employee or workplace deviance) are 'scalable actions and behaviors that employees engage in that detract from organizational goals or well-being and include behaviors that bring about undesirable consequences for the organization or its stakeholders' (Ones & Dilchert, 2013, p. 645). This definition emphasizes the behavioral nature of CWB, as opposed to including more distal outcomes, and best reflects the present approach to CWB. The literature around CWB, however, also encompasses outcomes of such behaviors, such as accidents and injuries, in both primary and meta-analytic studies.

Job performance is best represented as a multi-dimensional construct comprising several distinct sets of behaviors which contribute to the goals of an organization, and avoidance of CWB represents a key dimension of job performance, alongside task performance and organizational citizenship (J. P. Campbell & Wiernik, 2015; Viswesvaran & Ones, 2000). Work counterproductivity is a broad behavioral domain subsuming several narrower facets, such as absenteeism, theft, property damage, harassment, and sabotage, among others (Gruys & Sackett, 2003). Although these subdomains were studied independently for many years,

recent evidence has demonstrated a positive manifold among various CWB (Ones & Viswesvaran, 2003; Stanek, Ones, & McGue, 2017). Scholars have adopted a two-dimensional taxonomy of CWB, dividing the construct based on the target of each behavior into interpersonally targeted and organizationally targeted CWB (Berry, Ones, & Sackett, 2007; Robinson & Bennett, 1995). Interpersonally targeted counterproductive work behaviors (CWB-I), such as bullying, harm the well-being of organizational members or other stakeholders. In contrast, organizationally targeted counterproductive work behaviors (CWB-O) include those behaviors that directly harm the organization itself, such as theft, production deviance, absenteeism, or disloyalty.

ORGANIZATION OF THE PRESENT REVIEW

The scholarly literature that has investigated CWB is as rich and varied as the behavioral domain it addresses. Although this body of research is extensive, there remain many important literature gaps. In this chapter, we seek to provide a fundamental understanding of the nature, assessment, and nomological network of CWB. We also highlight emerging opportunities to contribute to this research domain, thereby catalyzing future research. Our hope is that readers will depart from this chapter with answers as well as new questions.

To accomplish these objectives, we employ a two-pronged approach. First, we review and highlight selected interesting and important developments within CWB scholarship to elucidate novel research questions. Second, to provide a foundational understanding of the nomological network of CWB, we present tables that comprehensively report meta-analytic estimates of CWB's convergent and discriminant validities. Categories of correlates addressed include additional performance criteria, psychological individual differences (personality and cognitive ability), affective states, demographic variables, organizational interventions, organizational justice variables, leadership and other relational constructs, and stressors. Throughout our review, we rely on meta-analytic estimates with strong N and k values and discuss relationships corrected for unreliability in both variables whenever possible. In our discussion of findings, we avoid overgeneralizations and do not give undue weight to small sample meta-analyses. For effects discussed in this chapter where no individual, specific source is cited, we have relied on or refer to the average effect across meta-analyses addressing a given

relationship as summarized in the relevant tables. The individual meta-analytic sources, as well as details on effect size estimates (such as corrections applied), are listed in those tables.

MEASUREMENT OF CWB

CWB can be measured using self-report and non-self-report (i.e., observer or organizational) measures. Measurement of CWB can also be multilevel (individual, group, organizational level). Finally, beyond organizational and interpersonal CWB, measures can reflect various specific CWB constructs such as retaliation, aggression, withdrawal, cyberdeviance and so forth. We take up each of these in turn.

Between-Source Differences

Organizational researchers have long been apprehensive of self-reports of CWB. Measures of CWB require respondents to divulge their participation in socially undesirable behaviors, potentially making such methods vulnerable to self-presentation biases. Additionally, many powerful predictors of CWB are also assessed using self-reports (e.g., personality, organizational justice). Therefore, it is often suggested that other-ratings can be strategically used to reduce threats of common method variance. Unfortunately, amidst concerns regarding self-reports, several limitations of other-ratings are sometimes overlooked. Self-raters are not the only respondents prone to bias. For example, systematic and unsystematic biases may negatively influence the quality of other-ratings. More importantly, because others can only observe a subset of employees' behaviors and therefore have limited information, other-ratings may incompletely portray employees' CWB. An evidence-based understanding of the merits of each rating source can guide measurement decisions and interpretation of findings in future CWB research.

Seeking to provide such insight, Berry, Carpenter, and Barratt (2012) meta-analytically assessed the convergence between CWB rating sources. Their findings, based on the results of 21 primary studies, exhibited notable convergence between self-reports and other-ratings. The two rating sources were moderately to strongly correlated, and their convergence was strengthened when greater assurances of anonymity were given. Furthermore, ratings from all sources

exhibited similar patterns of relationships with a common set of correlates. Ultimately, other-ratings accounted for little incremental variance in common correlates beyond self-reports. These results demonstrating convergence across sources should discourage discomfort in using either rating approach and encourage researchers to use the method most conceptually appropriate and feasible for their respective studies.

In addition to providing evidence of convergence, Berry and colleagues' meta-analysis also addressed the primary reasons researchers consider each rating source more rigorous than the other, including self-presentation biases and thoroughness of ratings. Their results partially confirmed some of these concerns. When common correlates were highly vulnerable to social desirability, self- and other-ratings converged slightly less. Yet, other-ratings were inferior in other respects. Remarkably, self-raters reported higher mean levels of CWB than other-raters; when respondents were provided greater assurances of anonymity, this effect was exacerbated with self-raters reporting even higher mean levels. Contrary to prevalent assumptions, employees report engaging in *more* CWB than their coworkers or supervisors report for them. This is likely due to the limitations of others' observations. Because only self-raters have complete knowledge of their own actions, others may have insufficient information about the ratees' behaviors. Further supporting that rationale, coworkers, who had greater opportunities to observe ratee behaviors than supervisors, reported mean levels more similar to self-reports than supervisor ratings. The importance of observational opportunities is also supported by evidence that self-reports and other-ratings converge more strongly for interpersonal CWB, which is often highly visible to others, compared with organizational CWB, which can be more easily concealed. Although self-reports may be afflicted by self-presentation biases, employees still provide a more thorough representation of their CWB than other-raters. Depending on the research question, self-reports may provide the best possible reflection of employee performance.

Overall, these findings coincide with similar analyses of related constructs (e.g., OCB; Carpenter, Berry, & Houston, 2014), demonstrating convergence across rating sources in addition to the merits of self-reports. Even when reported mean levels differ, CWB's nomological network remains similar across rating sources. This is positive news for IWO psychologists who are primarily concerned with the relationships CWB exhibit with other constructs. Both rating sources serve as valid forms of measurement and exhibit similar relationships with common correlates.

Meta-analytic relationships between self-reported and other-rated CWB are summarized in Table 6.1. Self-rated CWB and other-rated CWB are substantially related, with correlations in the .30 to .40 range (Berry et al., 2007), and this relationship does not appear to be moderated by the source of other-ratings (e.g., peer, supervisor). Whereas self-rated organizational CWB and other-rated organizational CWB demonstrate an effect of similar magnitude ($\rho = .35$), the relationship between self-rated interpersonal CWB and other-rated interpersonal CWB is stronger ($\rho = .51$). Based on small-scale data, Giordano and Ones (2016) noted that the general factor of CWB is consistent across rating sources but that self- and other-raters may have differential opportunity to observe behavior. Other-raters may attend much more to interpersonal-related behaviors whereas self-reports have larger factor loadings for organizational-related behaviors.

Group-Level CWB

Despite calls for investigation into possible group-level CWB citing the potential for teams, departments, or even organizations to collectively engage in CWB (e.g., Bowling & Gruys, 2010), the academic literature has remained centered on work counterproductivity as an individual-level behavioral domain. Recently, limited research has empirically explored the group- or work unit level of analysis. Such studies center around the potential effect of contextual variables, to which the entire group of employees is exposed, on group counterproductive performance. For example, Priesemuth, Arnaud, and Schminke (2013) examined group-level CWB in light of collective perceptions of justice and the functional dependence of the group's work. In situations where group members were less functionally dependent on one another, the relationship between justice climate and group-level CWB was strongest. Those employees experienced greater autonomy to perform in ways that helped them accomplish their own personal objectives, including engaging in CWB as a potential reaction to injustice. Although this study was limited in its operationalization of group-level CWB, relying on supervisor evaluations of the entire group's CWB, findings suggest that there is substantial opportunity to better understand the nature of work counterproductivity beyond the boundaries of individual-level behaviors. Future investigations might employ more sophisticated measures of group-level CWB to determine to what extent work counterproductivity might have a group-level component as well as

Table 6.1 Interrelations among CWB variables: Summary from meta-analyses

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Counterproductive Work Behaviors							
CWB Overall–Self-Rated							
CWB Overall ^{a,1,4}	1,459	10	.33		.40 	.11	.22, .58
CWB Overall ^{a,2,4}	3,503	21	.32		.38 	.18	.08, .68
CWB Overall ^{a,3,4}	2,044	11	.31		.37 	.21	.02, .72
CWB Overall							
Absenteeism ^b	7,676	11	.37		.52 	.25	.11, .93
Lateness ^b	329	3	.26		.33 	.16	.07, .59
Turnover Intentions ^b	8,049	17	.23		.29 	.10	.13, .45
Withdrawal ^b	20,827	46	.45		.58 	.19	.27, .89
CWB Organizational–Self-Rated							
CWB-Organizational ^{a,2,4}	1,500	9	.29		.35 	.18	.05, .65
Withdrawal ^b	13,080	28	.46		.58 	.19	.27, .89
CWB Organizational							
Absenteeism ^b	7,066	7	.36		.48 	.30	–.01, .97
Turnover Intentions ^b	6,878	10	.22		.27 	.05	.19, .35
CWB Interpersonal–Self-Rated							
CWB-Organizational ^{c,2}	3,014	2			.67 		
CWB-Organizational ^{c,5}	7,090	25			.61 		
CWB-Interpersonal ^{a,2,4}	1,500	9	.44		.51 	.14	.28, .74
CWB Interpersonal							
CWB-Organizational ^c	10,104	27	.52		.62 	.11	.44, .80
CWB-Organizational ^d	4,136	20	.52		.70 	.26	.27, 1.00
Supervisor-Directed Deviance ^m	2,295	3	.56		.62 	.09	.47, .77
Absenteeism ^b	1,164	4	.15		.19 	.22	–.17, .55
Turnover Intentions ^b	1,526	6	.21		.25 	.17	–.03, .53
Withdrawal ^b	5,865	18	.40		.50 	.24	.11, .89
Abuse							
Production Deviance ^f	3,930	11	.59		.73 		
Sabotage ^f	3,930	11	.59		.79 		
Theft ^e	2,713	6	.53		.66 		
Theft ^f	3,930	11	.56		.71 		
Withdrawal ^f	3,930	11	.51		.63 		

Table 6.1 Interrelations among CWB variables: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Production Deviance							
Abuse ^e	3,221	7	.61		.72		
Theft ^e	2,911	7	.60		.83		
Theft ^f	3,930	11	.56		.82		
Withdrawal ^b	5,038	14	.47		.59	.19	.28, .90
Withdrawal ^f	3,930	11	.53		.76		
Sabotage							
Abuse ^e	2,356	5	.58		.88		
Production Deviance ^e	2,916	7	.60		.94		
Production Deviance ^f	3,930	11	.60		.93		
Theft ^e	2,554	6	.57		.92		
Theft ^f	3,930	11	.59		.89		
Withdrawal ^b	4,071	12	.39		.49	.23	.11, .87
Withdrawal ^e	2,916	7	.50		.75		
Withdrawal ^f	3,930	11	.50		.75		
Theft							
Withdrawal ^b	9,082	15	.44		.55	.16	.29, .81
Withdrawal ^f	3,930	11	.53		.75		
Absenteeism							
Lateness ^g	8,013	25	.29	.14	.40		
Lateness ⁱ	10,397	38	.18		.26	.22	-.10, .62
Turnover ^h	5,316	33	.23	.12	.33	.09	.18, .48
Turnover ⁱ	9,594	45	.20		.25	.17	-.02, .52
Turnover ^j	5,364	28	.20		.21		
Absenteeism–Frequency							
Turnover ^h	3,841	22	.23	.11	.34	.08	.20, .47
Absenteeism–Time Lost							
Turnover ^h	1,159	9	.22	.14	.32	.13	.11, .53
Absenteeism–Voluntary							
Lateness ^g	8,013	25	.29	.14	.41		
Absenteeism–Involuntary							
Lateness ^g	1,109	6	.13	.13	.16		

(Continued)

Table 6.1 Interrelations among CWB variables: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Absenteeism—History of							
Absenteeism—Frequency ^k	2,653	10	.46	.07	.71		
Absenteeism—Time Lost ^k	7,465	15	.47	.01	.65		
Lateness							
Turnover Intentions ^g	3,109	9	.26	.19	.46		
Turnover ⁱ	2,499	12	.01		.01	.11	–.18, .20
Turnover ⁱ	2,283	6	.06		.06		
Turnover ^g	2,554	6	.07	.04	.07		
Turnover Intentions							
Turnover ⁱ	63,232	71	.35		.45		
Turnover ⁱ	83,522	48	.45	.05	.50	.05	.41, .59
Thinking of Quitting							
Turnover ⁱ	1,964	10	.22		.29		
Withdrawal Cognitions							
Turnover ⁱ	1,209	7	.30		.36		
Unsafe Behavior							
Accidents ⁿ	7,706	20	.14		.15		
Withdrawal							
Abuse ^e	3,221	7	.55		.68		
Production Deviance ^e	2,911	7	.55		.72		
Theft ^e	4,076	10	.54		.76		

Note. *N* = total sample size; *k* = number of effect sizes; *r_{obs}* = mean, sample size-weighted correlation; *SD_r* = standard deviation of *r*; *ρ* = meta-analytic correlation – see numerical superscripts for details on criterion measurement and corrections applied; *SD_ρ* = standard deviation of *ρ*; CI = credibility interval. Values for CI were computed when sources did not originally report them but provided *ρ* and *SD_ρ*. Data bars for *ρ* are scaled from .00 to 1.00 and reference absolute values; gray bars indicate negative and black bars indicate positive mean effects. Data sources: ^a Berry, Carpenter, & Barratt (2012); ^b Carpenter & Berry (2014); ^c Berry, Ones, & Sackett (2007); ^d Dalal (2005); ^e Cochran (2014) – *SD_ρ* was clearly incorrectly reported in the original source and is omitted here; ^f Marcus et al. (2013); ^g Koslowsky et al. (1997); ^h Mitra, Jenkins, & Gupta (1992); ⁱ Berry, Lechocok, & Clark (2012); ^j Griffeth, Hom, & Gaertner (2000); ^k Farrell & Stamm (1988); ^l Steel & Ovalle (1984); ^m Hershcovis & Barling (2010); ⁿ Beus, Dhanani, & McCord (2015). ¹ peer-rated; ² other-rated; ³ supervisor-rated; ⁴ corrected for range restriction; ⁵ self-rated.

to evaluate the effectiveness of simple assessments of group-level CWB, such as the supervisor ratings that Priesemuth and colleagues employed.

Evidence of group-level effects on CWB, especially those of norms and conformity, might indicate that the utility of predictors of counterproductivity has been underestimated. Individual differences and situational variables may influence not only an individual's productivity levels

but also the performance of each person with whom they interact. Individuals who engage in CWB may bring about CWB in others. Inquiries into group-level counterproductivity also call into question whether CWB is interchangeable with employee deviance. In organizational cultures of corruption, for example, counterproductive behaviors may no longer be normatively deviant. Concerns surrounding the nature of

counterproductivity in terms of normative deviance and the applicable levels of analysis for studies of this performance domain offer interesting and practically valuable opportunities for future research to further enhance the methodological rigor of CWB assessment.

Narrow CWB Constructs

The CWB literature has followed a curious trajectory over the past few decades. Originally, it comprised several independent streams of research, such as turnover intentions (e.g., Porter, Steers, Mowday, & Boulian, 1974), absenteeism (Ilgen & Höllenback, 1977), theft (Ones, Viswesvaran, & Schmidt, 1993), aggression (Chen & Spector, 1992), and withdrawal (Hanisch & Hulin, 1990), among others. Conceptually, and with regard to specific behavioral expressions, these appear to be somewhat distinct. However, researchers in the mid-1990s began to look at counterproductive behaviors in a broad, inclusive manner (Ones, 1993; Ones et al., 1993; Robinson & Bennett, 1995) which served to bridge these disparate streams of research together under the common umbrella of counterproductive work behaviors. Early taxonomic efforts set out to find parsimonious dimensions underlying this broad array of behaviors and found two dimensions of CWB: an interpersonally oriented versus organizationally oriented dimension and a minor versus severe dimension (Bennett & Robinson, 2000; Robinson & Bennett, 1995). Critics felt that the inclusion of organizational theft, tardiness, and purposefully doing work incorrectly provided unique information that is lost by considering each as merely a manifestation of organizational deviance (Spector et al., 2006). This period in the early 2000s was the beginning of the proliferation of narrow conceptions of CWB. Destructive leadership (Einarsen, Aasland, & Skogstad, 2007), social undermining (Duffy, Ganster, & Pagon, 2002), bullying (Zapf, 1999), and many other specific manifestations of CWB have surfaced in recent years. A full list of specific manifestations would be prohibitively large. Some manifestations have received enough attention that entire review papers are dedicated to their antecedents, occurrence, and outcomes. A discussion of all the various narrow constructs of CWB is not possible due to the vast number of forms involved and the scope of the literature associated with each. However, here we review and discuss employee aggression, retaliation, withdrawal, and cyber-CWB. Our choice was guided by the goal of reducing redundancy in the discussion of explanatory mechanisms while illuminating divergent motivations and functions underlying each.

Employee aggression

Employee aggression has been defined in two related yet distinct manners. Some authors distinguish between aggression and violence. The former is conceptualized as intentional psychological harm whereas the latter is conceptualized as physical harm (Greenberg & Barling, 1999). Others have defined aggression as any intentional harm toward a target (Vigoda, 2002). In the second conceptualization (any intentional harm), violence is deemed an extreme form of aggression, relying on a qualitative interpretation to distinguish between violent and non-violent aggression. Hershcovis and Barling (2007) point out five reasons for differing terms and definitions of workplace aggression: (1) different basic assumptions underlying the behaviors in the workplace, (2) the conceptualization of aggression, (3) target and degree of aggression, (4) assumed perspective of the behaviors, and (5) the intentionality and motivations. These equivocal definitions of aggression severely limit the ability of research to synthesize results across studies and thus draw generalizable conclusions regarding existing effects. For instance, employee theft is considered aggression if the perpetrator intended harm toward their target but is not considered aggression if mere acquisition of a tangible object was the proximal goal. Psychological aggression, such as belittling, slander, and spreading rumors may have different outcomes or antecedents than physical aggression. Acknowledging these discrepancies, Hershcovis and Barling (2007, 2010) synthesized a unifying definition by considering aggression to be (1) an aversive behavior, (2) directed at either an individual or the organization at large, (3) such that the target would otherwise wish to avoid. By removing constraints such as intent, specific actors/targets, and harm, this definition of aggression now sits on the same theoretical plane as broad CWB, creating confusion and difficulty in converging knowledge across the two streams of research.

A multitude of constructs fall under the purview of aggression (i.e., broad CWB). Some have argued that the diversification of narrow and specific behavioral sets are redundant and aggregation across forms of aggression is warranted (e.g., Bowling & Beehr, 2006). In their meta-analysis, Bowling and Beehr (2006) combine all interpersonally oriented aggressive behaviors into a single category of harassment. Other meta-analyses have used a similar approach and distinguished only interpersonal and organizational aggression which is directly analogous to the Bennett and Robinson (2000) dimension. Accumulating the broad aggression literature into two target-focused perspectives creates parsimony by recognizing

that the constituent aggressive components are all positively related and to a non-negligible degree (Gruys & Sackett, 2003). Deficient discriminant validity may be due, in part, to similar items found across multiple scales. Abusive supervision (Tepper, 2000), social undermining (Duffy et al., 2002), destructive leadership (Einarsen et al., 2007), bullying (Einarsen, 2000), ostracism (D. L. Ferris, Brown, Berry, & Lian, 2008), and still others contain items that assess rude behaviors. Results from meta-analytic compilations of constituent aggressive scales demonstrate clear support that the presence of aggression has negative behavioral, attitudinal, and physical consequences (Berry et al., 2007; Bowling & Beehr, 2006; Hershcovis, Turner, Barling et al., 2007; Hershcovis & Barling, 2010; Mackey et al., 2015; M. B. Nielsen & Einarsen, 2012; Schyns & Schilling, 2013).

Proponents of a diverse set of aggressive manifestations mainly attend to nuanced content domains captured by each (Tepper & Henle, 2011). Abusive supervision and social undermining pertain to sustained, long-term subversive behaviors (Duffy et al., 2002; Tepper, 2000). However, abusive supervision relies on subordinates' perceptions of mistreatment from supervisors while social undermining refers exclusively to enacted behaviors. Another difference is the status of the perpetrator involved; abusive supervision exclusively pertains to a supervisor-subordinate relationship whereas social undermining may come from supervisors or coworkers. Semantic differences exist but such differences are more prominent in the conceptual literature than empirical investigations (D. L. Ferris, Yan, Lim, Chen, & Fatimah, 2016). An implicit assumption is made that motivations for and outcomes associated with abusive supervision and social undermining differ due to the perception-enacted behavior distinction. In fact, many discrete aggressive constructs rely on weak assumptions that are often either unfounded or unsupported. Hershcovis (2011) explains how incivility is defined as low intensity behaviors yet items such as social exclusion may be perceived as intensely noxious to some. Pronounced individual differences exist within the workplace and more neurotic and less agreeable people tend to report higher levels of being harassed at work (M. B. Nielsen, Glasø, & Einarsen, 2017). It is unclear whether perpetrators specifically target neurotic individuals, neurotic individuals are hypersensitive and provide inflated perceptions, or some combination thereof exists.

Both broad and narrow conceptualizations have their merits. Demonstrating predictive validity for broad employee mistreatment is paramount in screening out potentially deviant applicants. Whether the applicant is likely to specifically

undermine, assault, psychologically harass, or bully others is irrelevant, the main premise is that all such manifestations of aggression are toxic to a work environment and predicting their overall occurrence is of utmost importance. On the other hand, once an individual has entered the organization, it becomes important to understand the underlying motivations and consequences of narrower behavioral aggression sets. For instance, experiencing more anger-inducing, direct forms of aggression (e.g., abusive supervision and social undermining) strongly predicts approach-oriented CWBs – behaviors that directly engage a target, such as swearing at a supervisor or playing a prank on them (D. L. Ferris et al., 2016). Isolationist forms of aggression, such as ostracism, and anxiety-inducing events are more indicative of avoidant CWB such as withdrawal. Dissatisfied individuals are also more likely to commit deviant acts toward the organization than against others (Hershcovis et al., 2007). Forms of abuse have stronger relations to conflict at work than do manifestations of theft and withdrawal (Spector et al., 2006). Understanding the situational factors plaguing an organization may shed light on which specific forms of CWB are most likely and will help in designing organizational interventions to specifically reduce them.

Lastly, aggression and aggressive behavior is a heavily studied topic in psychology, sociology, criminology, ethics, and many other domains. Numerous journals, such as *Aggressive Behavior* and *Aggression and Violent Behavior*, have been established for the sole purpose of disseminating knowledge about aggression in a cross-disciplinary forum. Information on interventions, biological and physiological underpinnings, prediction of recidivism, motivational forces, and many others have long histories in disciplines outside IWO psychology. To best advance knowledge surrounding these concerning behaviors, diligent research should take into consideration these established bodies of literature, rather than assuming aggression is novel and unique to the work context.

Retaliation

Organizational retaliation behaviors (ORB) are a subset of behaviors enacted by individuals in retribution for perceived unfairness (Folger & Skarlicki, 2005; Skarlicki & Folger, 1997). Paramount to this conception is retribution; individuals are perceived to be slighted in some manner and thus retaliate in response to the wrong-doing. The original scale to assess retaliation was developed via critical incident reports and comprises behaviors from real occurrences of ORB, but the scale itself asks respondents 'to indicate the frequency that they observed the

appraisee engage in the behavior over the past month' (Skarlicki & Folger, 1997, p. 437). Considering the items range from destroying property, stealing supplies, taking extended breaks, spreading rumors, and disobeying instructions, their scale reflects a broad CWB measure. Without the emphasis on reactionary behaviors, ORB only adds to the CWB literature by providing a new label to the ever-swelling lexicon of employee deviance.

The literature on ORB is mostly grounded in that of organizational justice and frames the phenomenon purely from the perspective of individuals as the aggressors. Retaliation has been examined in several forms, such as organizations retaliating against whistleblowers (e.g., Mesmer-Magnus & Viswesvaran, 2005), retaliation of global economies (e.g., Anderson, 2002), or even retaliation of local street gangs (Decker, Melde, & Pyrooz, 2013). Due to being engrained in the justice literature, the most prevalent antecedent of ORB is the perception of inadequate procedural, distributive, and interactional justice (Skarlicki & Folger, 1997). Some direct evidence supports personality and emotions predicting the occurrence of retaliation – based on an open-ended question rather than the Skarlicki and Folger questionnaire – above the perceptions of justice (Barclay, Skarlicki, & Pugh, 2005). Claiming to assess retaliation, several researchers found evidence that self-control largely predicts which individuals will commit supervisor-directed deviance (Lian et al., 2014). However, they also measured retaliation as general deviance directed at the supervisor without a specification of reactionary or retributive behaviors. Aggression toward the supervisor was remarkably related to perceptions of abusive supervision ($r = .73$ and $.52$), but there is no causal support for retaliation as a reaction to abusive supervision.

Again, research outside of IWO psychology has examined retaliation in several related contexts that may shed light on organizational behaviors. According to work in criminology, retaliation often occurs when a victim assumes a vigilante role when they feel that justice has not been properly served (Tyler & Johnson, 2004). As an extreme example, drug dealers are unable to resort to the traditional channels for seeking justice (i.e., law enforcement) after a client robs them during a drug deal. Interviews from 20 recently robbed drug dealers found that dealers prefer direct retaliation as a form of vengeance 'because it has the potential to fulfill all the goals associated with formal justice' (Topalli, Wright, & Fornango, 2002, p. 349). When retaliation is infeasible, they attempt to recoup their losses from another criminal avenue (e.g., rob other dealers, sell more

drugs). Retaliation appears to be more prominent in cases where formal justice may not suffice and when victims feel either threatened or feel obliged to a form of payback (e.g., repairing their reputation, recouping their losses). Retaliation need not be directed at the original source of anguish and may be displaced on others.

Discrepancies in measurement aside, ORB places great emphasis on the motivations underlying behavior. Implicit in depictions of ORB is that a single manifestation of deviance may cascade from one (or a combination of) several motivating influences. Intentionally wasting time, an item on the ORB scale, may result from inadequate distributive justice (retaliation), poor attitudes (e.g., job dissatisfaction), personality tendencies (e.g., low conscientiousness), organizational norms (loafing), or lack of motivation (e.g., burnout), to name just a few. Its presence on the ORB scale assumes the sole motivation for wasting time is a reaction due to a perceived wrong-doing. Ultimately, if an HR intervention is attempting to reduce CWB, no panacea may account for all motivational influences. Studying narrow motivating influences, such as retaliation, may allow researchers to hone in on why certain behaviors occur and what types of consequences stem from these behaviors. To accomplish this objective, however, researchers must *actually* measure retaliation and associated causes or provide respondents with the specific frame of reference of retaliation.

Withdrawal

Withdrawal behaviors refers to employees' disengagement from and avoidance of characteristics of the workplace environment (Hanisch & Hulin, 1990, 1991). Employee withdrawal research was thriving well before being absorbed into the territory of broad deviant behaviors (e.g., Hulin, Roznowski, & Hachiya, 1985; Mobley, 1977). However, past conceptualizations of withdrawal were based on the *process* of withdrawal rather than *behavioral* withdrawal. Emerging from the job (dis)satisfaction literature, work that emphasized the withdrawal process focused on what happens between the onset of dissatisfaction and employee turnover (G. R. Ferris, 1985). Integrating several works on withdrawal and the process of withdrawal, Hulin et al. (1985) proposed that behavioral intentions were better markers of withdrawal outcomes, such as turnover, than were attitudes. Thus began the trend of studying *behavioral* withdrawal (Hanisch & Hulin, 1990, 1991).

Today, a significant portion of the extant literature on withdrawal has been subsumed under the umbrella of CWB (Carpenter & Berry, 2014). Specifically, it is viewed as a component

of organizational deviance (Dalal, 2005; Spector et al., 2006) in the hierarchy of counterproductive behaviors. But measures of withdrawal behaviors may suggest a more complex construct. Lehman and Simpson (1992) distinguish between physical and psychological withdrawal. Whereas some consider withdrawal to only constitute behaviors physically removing oneself from the workplace (i.e., absenteeism, lateness, and turnover; Zimmerman, Swider, Woo, & Allen, 2016), Carpenter and Berry (2014) broadly conceptualize withdrawal, including absenteeism, tardiness, turnover intentions, and specific withdrawal scales (e.g., Hanisch & Hulin, 1991; Lehman & Simpson, 1992).

Psychological withdrawal behaviors (e.g., chatting with coworkers about nonwork topics, letting others do your work, falling asleep at work) may or may not represent disengagement or avoidance of work. Differences in conceptualizing withdrawal may make generalizations difficult and constrain research. Assessing early attitudinal and behavioral manifestations of withdrawal is important as they predict future turnover, an expensive and potentially undesirable outcome when otherwise highly performing and valuable employees are lost. Direct assessments of disengagement and underlying motivations for withdrawal may be helpful in this regard. Finally, we note that other forms of CWB are increasingly included in withdrawal measures (e.g., inclusion of 'taken supplies or equipment without permission' as physical withdrawal items), further contaminating the withdrawal construct measurement. Content overlap between withdrawal and non-withdrawal behaviors is not a new topic of discussion (e.g., Bozeman & Perrewé, 2001) but it has yet to be rectified. Future research clarifying the conceptualization of withdrawal behaviors, investigating many potential motives for these behaviors, and demonstrating their impact on organizations would greatly contribute to closing important gaps in the literature.

Cyber-counterproductive work behaviors

Just as new information and communication technologies (ICTs) have contributed to firm profitability, these new channels of communication have also introduced additional opportunities for employees to be counterproductive. Employee misuse of technology influences organizations in many ways, including productivity and resource losses as well as security threats and liability concerns, and has consequently captured the attention of employers. However, unlike aggression and withdrawal, technologically mediated CWB have been largely

neglected by scholars. This dearth of research is likely because most taxonomies and measures of CWB were created before the popularization of readily (employee-) accessible information technology in the workplace. This literature gap has unfortunately spurred further negligence on the topic, with some scholars even suggesting that technologically mediated CWB are the same as other forms of CWB without evidence to substantiate their arguments (e.g., Block, 2001). As IWO psychologists, our mission lies in the creation of evidence-based knowledge. Therefore, to continue to rigorously examine CWB, the construct's coverage – potentially including technologically mediated behaviors – and the nomological network of this broad set of behaviors must be empirically investigated.

From the limited research that has been conducted on employee technology misuse, a common thread is visible; these behaviors negatively influence performance. Even when organizations are open to innovative uses of technology to harness ICTs for firm growth, the net effect can be costly to organizations. Landers and Callan (2014) examined overall work-related social media use, including both activities that were potentially beneficial to companies and those that were seen as harmful. When employees engaged in social media use intending to benefit their firm, job performance was largely unaffected. However, harmful social media activities did relate strongly negatively to task, contextual, and adaptive performance and strongly positively to CWB, indicating that the overall effect of employees' work-related social media use is negative. This is just one example of how employees can utilize technology to the detriment of their organizations. Bock and Ho (2009) also found the more general construct of nonwork-related computing negatively related to supervisor-rated job performance. Moreover, they found that nonwork-related computing was more costly to performance than nonwork-related activities that were not computerized, such as interrupting work to socialize with coworkers. As these selected studies illustrate, employees do use technology in ways that harm their organizations; therefore, these behaviors fall within the domain of counterproductivity. The fact that their consequences can be even more severe than those of traditional CWB means that they bear investigation.

Mercado (2017) defined cyber-counterproductive work behaviors (cyber-CWB) as 'employee behaviors that, utilizing information communication technology, detract from legitimate organizational goals or well-being and include behaviors that bring about undesirable consequences for the organization or its stakeholders'

(p. 5). This definition introduces cyber-CWB as a broad facet of behavior including hacking, cyber-harassment, adult Internet use, IP violations, negligent IT practices, cybergripping, deception, cybertheft, and cyberloafing, among others. Such a conceptualization extends CWB by recognizing new manifestations of counterproductivity rather than positing an entirely new behavioral domain.

Few scholars have similarly conceptualized cyber-CWB as a broad set of behaviors. In his review of counterproductive use of technology at work, Weatherbee (2010) used the overarching term of cyberdeviancy to include many of these behaviors. However, later empirical endeavors did not follow this path, instead focusing on specific facets, such as cyberbullying (Hinduja & Patchin, 2008), cyber incivility (Lim & Teo, 2009), cyberloafing (Lim, 2002), nonwork-related social media use (Landers & Callan, 2014), and nonwork-related computing (Pee, Woon, & Kankanhalli, 2008). This focus on narrow facets is likely due to the existence of validated scales and objective measures of these specific behaviors, while a similarly well-tested measure has only recently been developed to assess cyber-CWB more broadly (Mercado, 2017).

Of all forms of cyber-counterproductivity, cyberloafing has received the most research attention. Cyberloafing has been defined as employees' use of company Internet to attend to personal tasks during office hours (Lim, 2002) and has been referred to as the 'IT way of idling on the job' (p. 678). The level of attention paid to cyberloafing may be due to its prevalence, and the fact that due to the availability of personal ICT devices, most organizations are at risk for it. Nearly all employees are sufficiently able and tempted to engage in cyberloafing. Blanchard and Henle (2008) identified two types of cyberloafing. Behaviors such as attending to personal email or accessing nonwork webpages were deemed minor cyberloafing. In contrast, serious cyberloafing behaviors included accessing adult-oriented sites and engaging in gambling online. Notably, employees' perceptions of coworker and supervisor norms – whether employees believed their behavior was acceptable – only influenced minor cyberloafing in their study. Employees who engaged in serious cyberloafing were aware that it was unacceptable yet relatively unaffected by those perceptions. High beliefs in chance, a dimension of external locus of control, positively influenced both minor and serious cyberloafing, likely because employees who believe negative consequences are doled out based on bad luck rather than actual deviant behavior have fewer incentives to restrict their cyberloafing.

Several other scholars have posited explanations for why employees engage in cyberloafing.

Lim (2002) explored employees' rationalizations of their cyberloafing behaviors using neutralization through the metaphor of the ledger. With this technique, individuals consider positive behaviors from their past purposing to justify future indulgence in deviant behaviors. This neutralization explained the relationship between employee perceptions of injustice and cyberloafing. Other mechanisms, such as work stressors, have also been investigated (Henle & Blanchard, 2008). Specifically, both role overload and organizational sanctions were related to less cyberloafing, potentially due to limited opportunities to cyberloaf. However, other work stressors, such as role ambiguity and role conflict, positively predict cyberloafing, particularly in situations of low organizational sanctions. Another group of studies has examined cyberloafing through the lens of self-regulatory frameworks. The ego depletion model recognizes self-control resources as finite reserves that must be replenished via rest. Essentially, people deplete their fixed reserves of self-control until those reserves are restored. Supporting this logic, sleep quantity and quality negatively related to cyberloafing in both large-scale observational and experimental settings (Wagner, Barnes, Lim, & Ferris, 2012).

Although cyberloafing is concerning to all employers, the threat is particularly salient for employers of remote workers, an increasingly common arrangement in today's workforces. Although no study has yet to directly compare cyberloafing levels across individuals in different work arrangements, O'Neill, Hambley, and Bercovich (2014) measured cyberloafing in a sample of employees working away from the office by asking how frequently they engaged in such behaviors when working from home relative to when they work from the office. Personality moderately related to cyberloafing; procrastination demonstrated positive effects while honesty, agreeableness, and conscientiousness demonstrated negative correlations with the behavior. Employees who were dissatisfied with remote work and did not perceive their performance as high were most likely to cyberloaf.

In contrast to cyberloafing, the majority of cyber-CWB has received no systematic scholarly attention, even though existing studies demonstrate that cyber-CWB are occurring in modern organizations and thereby harming firms. The limited existing research suggests that cyber-CWB share predictors with traditional forms of CWB (e.g., personality); however, additional explanations of novel mechanisms have also received support. Further investigation into these contemporary behaviors will contribute theoretically to our understanding of the nomological network and construct conceptualization of CWB overall,

broadening our understanding of what constitutes counterproductivity in the modern workplace.

Cyber-CWB must also be studied further because several forms of cyber-CWB that pose great risk to organizations have been overlooked to date. For example, online criminal behaviors, misrepresentation, and data insecurity may threaten firms more gravely than employees accessing social media accounts. CWB research has traditionally centered on creating evidence-based solutions to address modern practical concerns. To continue that rich tradition, scholars must develop a more inclusive view of cyber-CWB and utilize corresponding measures to empirically investigate its antecedents. Just as a positive manifold has been demonstrated across various facets and subdimensions of work counterproductivity, so may the currently disconnected forms of cyber-CWB be meaningfully and empirically related. In addition to assessing cyber-CWB broadly, future research will be particularly fruitful if enriched by relevant topics from other disciplines, such as cybercrime and online addictions. While the organizational behavior and work psychology fields have lagged behind with regard to advancement of technology (Ones, Kaiser, Chamorro-Premuzic, & Svensson, 2017), other disciplines such as information sciences and criminology can readily contribute meaningful theoretical frameworks. Currently, we know that organizations are at risk for cyber-CWB, but with insufficient knowledge of its underlying mechanisms or convergence with other forms of CWB, we are in no position to partner with practitioners to address these concerns.

Empirical Relationships Among CWB Constructs: Review of Meta-Analytic Findings

Conceptual issues described above notwithstanding, 14 meta-analyses have reported relationships among CWB constructs at different levels of the CWB hierarchy; those findings are summarized in Table 6.1. Overall CWB is correlated in the .29 to .58 range with narrower withdrawal-related constructs, including absenteeism, lateness, turnover intentions, and other forms of withdrawal (Carpenter & Berry, 2014). Organizational CWB demonstrates relationships of similar magnitude with these narrower constructs. However, interpersonal CWB exhibits a more varied pattern of relationships with withdrawal, although the small number of studies included in the meta-analyses could well be responsible for this discrepancy. Interrelationships between narrower forms of CWB, such as abuse, production deviance,

sabotage, theft, and withdrawal, are much stronger (ρ s range from .75 to .85; Carpenter & Berry, 2014; Cochran, 2014; Marcus, Taylor, Hastings, Sturm, & Weigelt, 2013). Abuse demonstrates strong relationships with production deviance, sabotage, and theft (average $\rho = .75$). Similar effects occur for production deviance with abuse and theft (average $\rho = .79$). The relationships of sabotage with abuse, production deviance, and theft are even greater in magnitude (average $\rho = .91$). Withdrawal demonstrates slightly weaker relationships with other narrow CWB constructs, with average correlations of .68, .66, and .65 for production deviance, sabotage, and theft, respectively.

Among narrow constructs that have traditionally made up the withdrawal domain, interrelationships are weaker in magnitude. Absenteeism demonstrates a moderate relationship with lateness and turnover (average $\rho = .29$), and the absenteeism–turnover relationship is not moderated by type of absenteeism measure (e.g., frequency versus time lost). Having a history of absenteeism strongly predicts future absenteeism (average $\rho = .68$). Lateness is strongly related to turnover intentions ($\rho = .46$); however, it is unrelated to actual turnover (average $\rho = .05$). Although turnover cognitions and intentions are strongly related to actual turnover (average $\rho = .40$), this relationship is far from unity. Similarly highlighting the distinctions between behaviors and outcomes, unsafe behavior exhibits only a small positive relationship with accidents ($\rho = .15$).

All in all, different forms of CWB are positively and often strongly correlated. Counterproductive behaviors typically correlate extremely strongly with other CWB, whereas intentions only moderately to weakly correlate with actual behaviors and outcomes. It appears that the withdrawal subdomain of CWB is composed of more loosely related constructs than other CWB subdomains (e.g., interpersonal deviance). Meta-analytic research has yet to examine relationships between some subdomains of CWB with other specific subdomains. Such examples include relationships between substance abuse and received or enacted sexual harassment, social undermining and sabotage behaviors, and many more. Primary research on the interconnected nature of specific forms of CWB may be needed to bolster future meta-analytic work in this domain.

RELATIONS WITH OTHER WORK CRITERIA

Arguably, job performance is the most important variable in IWO psychology (Campbell & Wiernik, 2015). Similar to the hierarchical structure of CWB,

the domain of job performance is hierarchically organized with an overall job performance construct composed of task performance, citizenship behaviors, and CWB (Viswesvaran, Schmidt, & Ones, 2002). Avoidance of CWB has long been conceptualized as one of the main subdomains of job performance (Campbell & Wiernik, 2015; Viswesvaran & Ones, 2000). Rotundo and Sackett (2002) demonstrated in a policy-capturing study that most managers consider CWB at least as important as task performance when evaluating overall performance. Turning to other non-CWB dimensions of job performance, there are many additional specific performance variables (facets), such as creative and innovative performance, interpersonal behavior, and effort. In this section, we review meta-analytic findings of the relationships between CWB and other performance criteria.

We located 16 meta-analyses that addressed CWB relationships with performance and related constructs (Table 6.2). Overall job performance relates moderately negatively to withdrawal-related constructs such as lateness, turnover intentions, and turnover (ps range from $-.15$ to $-.28$). The modest relationship here suggests that although overall job performance and withdrawal behaviors have some common correlates, organizations may need to focus on their distinct predictors and interventions to influence withdrawal behaviors beyond those strategies implemented to maximize overall job performance. Aiming to minimize turnover through hiring or other interventions might have a somewhat negative impact on job performance. Conversely, maximizing overall job performance may have modest negative consequences in the form of withdrawal. Maximizing both should be possible by utilizing their common determinants that help in both domains (e.g., using conscientiousness in selection, improving working conditions).

Conflicting evidence for the relationship between task performance and CWB has been reported. Two meta-analyses have examined this relationship (Carpenter & Berry, 2014; Colquitt et al., 2013). The former reported a very small positive relationship ($p = .09$) while the latter found a strong negative relationship ($p = -.47$). Both analyses were limited by a relatively small number of studies ($k = 7$ and 5 , respectively). Because maximizing task performance and minimizing CWB represent key objectives in all occupational contexts, a more robust estimate of this relationship, combined with deeper understanding of how these important constructs are related, would substantially contribute to both research and practice.

In contrast to the mixed findings for overall task performance, specific subdimensions of performance are strongly negatively related to overall

CWB. Controlling for same-source bias, administrative behavior demonstrates a strong negative relationship with overall CWB ($p = -.43$), as do interpersonal behavior ($p = -.57$) and effort ($p = -.60$). Although slightly weaker in magnitude, creative and innovative performance correlates moderately with overall CWB (ps ranging from $-.20$ to $-.23$). Narrower CWB criteria corroborate these results for overall CWB as well. Absenteeism demonstrates substantial negative relationships with interpersonal behavior ($p = -.33$) and effort ($p = -.54$). Withdrawal correlates moderately with creative and innovative performance ($p = -.22$). Finally, overall safety performance correlates notably with accidents and injuries ($p = -.31$; Christian, Bradley, Wallace, & Burke, 2009).

Objective performance indicators and outcomes are negatively related with CWB. Controlling for same-source bias, productivity indices correlate strongly negatively with overall CWB ($p = -.61$) and moderately with absenteeism ($p = -.21$). Quality indices also correlate substantially with overall CWB ($p = -.27$) and absenteeism ($p = -.48$). These findings indicate that individuals who engage in counterproductive work behaviors also exhibit lower levels of desirable components of performance. However, the causality and potential bidirectionality of these relationships has not been sufficiently examined. For example, extrinsic career success indicators display small negative correlations with withdrawal behaviors (mean $p = -.15$ across absenteeism and turnover measures). Similarly, voluntary turnover relates modestly to promotions ($p = -.10$) to and chances of promotion ($p = -.16$). Although individuals who more frequently engage in withdrawal behaviors are less likely to ascend the corporate ladder, individuals who are dismayed at their lack of career success may also be disengaged and consequently display withdrawal.

Organizational citizenship behaviors refer to 'individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system and that in aggregate promotes the effective functioning of the organization' (Organ, 1988, p. 4). Overall, OCB demonstrates varied relationships with CWB criteria. Across seven meta-analyses, the unit weighted average correlation between overall OCB and overall CWB is $-.39$. The level of this correlation supports the notion that CWB and OCB are not merely antipodes along the same continuum. Overall, OCB correlates substantially negatively with self-reported organizational CWB ($p = -.44$) and modestly negatively with other-reported organizational CWB ($p = -.15$). Weaker relationships are exhibited with interpersonal CWB ($ps = -.21$ and $-.04$, respectively, for self-reports and

Table 6.2 Relations among performance variables and CWB: Summary from meta-analyses

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Job Performance–Behaviors							
Job Performance–Overall							
Lateness ^b	1,870	4	-.17	.19	-.21		
Turnover intention ^c	8,361	42	-.10		-.15	.10	-.31, .01
Turnover ^d	7,717	24	-.22	.03	-.28	.20	-.61, .05
Turnover ^e	25,234	72	-.14		-.17		
Withdrawal ^{f,1}	596	2	-.08	.00			
Job Performance–Task							
CWB Overall ^g	1,764	7	.08		.09	.27	-.35, .53
CWB Overall ^h	933	5			-.47		
Withdrawal ^g	1,784	7	.01		.02	.30	-.47, .51
Administrative Behavior							
CWB Overall ^{q,3,9}	322		-.29		-.43		
CWB Overall ^{q,3,8}	161		-.63		-.74		
CWB Overall ^{q,3,7}	4,129		-.39		-.51		
Interpersonal Behavior							
CWB Overall ^{q,3,9}	1,536		-.33		-.57		
CWB Overall ^{q,3,8}	939		-.63		-.91		
CWB Overall ^{q,3,7}	11,590		-.62		-.75		
Absenteeism ^a	2,753	15	-.20		-.33	.31	-.84, .18
Effort							
CWB Overall ^{q,3,9}	1,006		-.34		-.60		
CWB Overall ^{q,3,8}	674		-.57		-.75		
CWB Overall ^{q,3,7}	8,338		-.59		-.80		
Absenteeism ^{a,3}	1,615	10	-.35		-.54	.30	-1.00, -.05
Creative and Innovative Job Performance							
CWB Overall ⁱ	1,782	6	-.21		-.23	.13	-.44, -.02
CWB Overall ^{i,2}	1,281	4	-.20		-.23	.16	-.49, .03
Deviance ⁱ	716	3	-.18		-.20	.07	-.32, -.08
Withdrawal ⁱ	1,281	4	-.19		-.22	.17	-.50, .06
Safety Compliance							
Accidents/Injuries ^l	1,905	8	-.11		-.14	.07	-.26, -.02

Table 6.2 Relations among performance variables and CWB: Summary from meta-analyses (continued)

Measure	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	ρ	<i>SD_ρ</i>	90% <i>CI</i>
Safety Participation							
Accidents/Injuries ^l	2,004	4	-.12		-.15	.03	-.20, -.10
Safety Performance							
Accidents/Injuries ^l	1,876	6	-.25		-.31	.28	-.77, .15
Job Performance – Outcomes							
Productivity							
CWB Overall ^{q,3,9}	322		-.31		-.61		
CWB Overall ^{q,3,8}	161		-.63		-.95		
CWB Overall ^{q,3,7}	4,655		-.61		-.77		
Absenteeism ^a	1,825	7	-.17		-.21	.21	-.56, .14
Quality							
CWB Overall ^{q,3,9}	322		-.18		-.27		
CWB Overall ^{q,3,8}	161		-.64		-.75		
CWB Overall ^{q,3,7}	4,740		-.47		-.60		
Absenteeism ^a	1,290	12	-.37		-.48	.22	-.84, -.12
Income							
Absenteeism ^l	878	3	-.08		-.14	.05	-.22, -.06
Absenteeism (Frequency) ^k	3,191	6	-.10	.00	-.14		
Absenteeism (Time Lost) ^k	2,689	4	-.12	.01	-.19		
Turnover ^e	14,191	19	-.09		-.11		
Promotion Chances							
Turnover ^e	5,752	10	-.11		-.16		
Promotion							
Turnover (Voluntary) ^f	7,675	21	-.12	.01	-.10	.01	-.11, -.09
Misc.							
Job Search-General							
Turnover ^e	1,811	9	.21		.29		
Job Search Behavior							
Turnover ^e	1,109	4	.26		.31		
Job Search Methods							
Turnover ^e	573	2	.42		.50		
Search Intentions							
Turnover ^e	4,308	19	.26		.34		

(Continued)

Table 6.2 Relations among performance variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Organizational Citizenship Behaviors							
OCB Overall							
CWB Overall ^g	4,514	15	-.21		-.27 	.23	-.65, .11
CWB Overall ^m	16,721	49	-.27		-.32 	.34	-.88, .24
CWB Overall ^{m,2}	11,348	40	-.12		-.15 		
CWB Overall ^{m,3}	4,944	6	-.60		-.71 		
CWB Overall ^h	2,384	10			-.51 		
CWB Overall ^{n,4,5,6}	712	5	-.16		-.19 	.03	-.24, -.14
CWB Overall ^{n,4,6}	1,509	11	-.47		-.56 	.19	-.87, -.25
CWB-Organizational ^o	2,725	8	-.36		-.44 	.11	-.62, -.26
CWB-Organizational ^g	2,226	8	-.12		-.15 	.30	-.64, .34
CWB-Interpersonal ^o	2,725	8	-.17		-.21 	.14	-.44, .02
CWB-Interpersonal ^g	2,016	7	-.03		-.04 	.21	-.39, .31
Absenteeism ^g	790	3	-.04		-.05 	.00	-.05, -.05
Absenteeism ^p	4,037	15	-.13		-.16 	.07	-.28, -.04
Turnover Intentions ^g	2,146	9	-.21		-.26 	.15	-.51, -.01
Turnover ^p	3,917	12	-.13		-.14 	.08	-.27, -.01
Withdrawal ^g	4,411	15	-.13		-.17 	.17	-.45, .11
OCB – Organizational							
CWB Overall ^{n,4,5,6}	612	4	-.11		-.13 	.06	-.23, -.03
CWB Overall ^{n,4,6}	1,065	7	-.46		-.56 	.13	-.77, -.35
CWB-Organizational ^m	4,269	20	-.27		-.33 	.25	-.74, .08
CWB-Interpersonal ^m	3,962	19	-.13		-.17 	.26	-.60, .26
Absenteeism ^p	1,518	4	-.11		-.14 	.00	-.14, -.14
Turnover Intentions ^p	9,672	37	-.16		-.20 	.14	-.43, .03
Turnover ^p	1,253	4	-.14		-.18 	.03	-.23, -.13
OCB – Interpersonal							
CWB Overall ^{n,4,5,6}	612	4	-.27		-.34 	.20	-.67, -.01
CWB Overall ^{n,4,6}	2,016	9	-.33		-.41 	.21	-.76, -.06
CWB-Organizational ^o	4,526	21	-.14		-.16 	.32	-.69, .37

Table 6.2 Relations among performance variables and CWB: Summary from meta-analyses (continued)

Measure	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	ρ	<i>SD_ρ</i>	90% <i>CI</i>
CWB-Interpersonal ^m	3,962	19	-.11		-.11 	.36	-.70, .48
Absenteeism ^p	1,870	6	-.11		-.13 	.00	-.13, -.13
Turnover Intentions ^p	10,337	40	-.09		-.11 	.10	-.27, .05
Turnover ^p	1,429	5	-.10		-.11 	.05	-.19, -.03
OCB – Conscientiousness Initiative							
CWB-Organizational ^o	2,020	5	-.36		-.47 	.09	-.62, -.32
CWB-Interpersonal ^o	2,020	5	-.15		-.20 	.15	-.45, .05
OCB – Organizational Support							
CWB-Organizational ^o	3,253	8	-.36		-.46 	.16	-.72, -.20
CWB-Interpersonal ^o	3,253	8	-.19		-.24 	.13	-.45, -.03
OCB – Personal Support							
CWB-Organizational ^{o,2}	3,386	9			-.37 		
CWB-Organizational ^{o,4}	257	1			-.58 		
CWB-Organizational ^o	3,643	10	-.30		-.38 	.12	-.58, -.18
CWB-Interpersonal ^o	3,386	9	-.24		-.31 	.18	-.61, -.01

Note. *N* = total sample size; *k* = number of effect sizes; *r_{obs}* = mean, sample size-weighted correlation; *SD_r* = standard deviation of *r*; ρ = meta-analytic correlation – see numerical superscripts for details on criterion measurement and corrections applied; *SD_ρ* = standard deviation of ρ ; *CI* = credibility interval. Values for *CI* were computed when sources did not originally report them but provided ρ and *SD_ρ*. Data bars for ρ are scaled from .00 to 1.00 and reference absolute values; gray bars indicate negative and black bars indicate positive mean effects. Data sources: ^a Viswesvaran (2002); ^b Koslowsky et al. (1997); ^c Zimmerman & Darnold (2009); ^d McEvoy & Cascio (1987); ^e Griffeth, Hom, & Gaertner (2000); ^f Carr et al. (2003); ^g Carpenter & Berry (2014); ^h Colquitt et al. (2013); ⁱ Harari, Reaves, & Viswesvaran (2016); ^j Lau, Au, & Ho (2003); ^k Farrell & Stamm (1988); ^l Christian et al. (2009); ^m Dalal (2005); ⁿ Berry, Carpenter, & Barratt (2012); ^o Berry, Ones, & Sackett (2007); ^p Podsakoff et al. (2009); ^q Viswesvaran, Schmidt, & Ones (2005). ¹ not corrected for measurement error; ² self-report; ³ supervisor-ratings; ⁴ other-report; ⁵ without same-source samples; ⁶ corrected for indirect range restriction; ⁷ corrected for interrater reliability; ⁸ peer-report; ⁹ supervisor–peer convergence.

other-ratings). Withdrawal-related constructs relate weakly to overall OCB (across meta-analyses, mean ρ = -.11 and -.14 for absenteeism and turnover, respectively). Organizational OCB relates to organizational CWB more strongly than interpersonal CWB (ρ s = -.33 and -.17, respectively). However, the opposite pattern is not exhibited; interpersonal OCB relates weakly to both interpersonal and organizational CWB (ρ s = -.11 and -.16, respectively). Facets of OCB, such as conscientiousness initiative, organizational support, and personal support, have somewhat varied relations with interpersonal and organizational CWB. Following intuition, organizational support has a more robust negative correlation

with organizational CWB (ρ = -.46) compared with interpersonal CWB (ρ = -.24). Conscientious initiative follows the same pattern of relationships with organizational and interpersonal CWB (ρ = -.47 and -.20, respectively). Personal support has equally negative correlations with organizational and interpersonal CWB (ρ s = -.38 and -.31, respectively). A burning research question in this area is whether the same specific targets are the recipients of citizenship and counterproductive behavior: do individuals enact both OCB and CWB toward the same people or do they engage in CWB toward one set of individuals but OCB toward another set of individuals? Network analyses may shed light on this question.

DETERMINANTS OF CWB

Correlates and determinants of CWB are found both in individual differences characteristics and contextual factors. The former constitute the potential psychological capital and liabilities that individuals bring to their work environments. The latter capture the environmental influences that contribute to CWB. To enrich our understanding of counterproductivity at work, here we describe the nomological network of CWB measures in terms of potential antecedents. We first provide a brief overview of relations with psychological individual differences variables. We then present relationships with demographic variables, before turning attention to contextual factors.

Individual Differences

Individuals vary in their propensities to engage in CWB, and a large proportion of this variance is due to variability in stable individual differences characteristics. Psychological individual differences examined in connection with CWB mostly revolve around personality constructs. Counterproductivity relations with cognitive ability have also received attention in the literature. We take up each in turn.

Personality

Ones, Viswesvaran, and Dilchert (2005) describe personality as

a spectrum of individual attributes that consistently distinguish people from one another in terms of their basic tendencies to think, feel, and act in certain ways. The enduring nature and consistency of personality characteristics are manifested in predictable tendencies of individuals to behave in similar ways across situations and settings. (p. 390)

Personality attributes can also be conceptualized as density distributions of behavior (Fleeson, 2001). Such density distributions are characterized by individual behavioral repertoires that are typically utilized. In this conceptualization, relative standings on traits are central tendencies of behavioral distributions.

The Big Five dimensions of personality constitute the currently most widely accepted broad trait families reflecting major personality differences among individuals (John, Naumann, & Soto, 2008; Stanek & Ones, Chapter 13, this *Handbook*). These five factors have emerged across sexes, ages, raters, inventories, cultures, and languages, indicating the robustness and generalizability of the Five-Factor Model (Connelly & Ones, 2010;

Dilchert, Ones, van Rooy, & Viswesvaran, 2006; Goldberg, 1993; McCrae & Costa, 1987).

The five major personality dimensions are: emotional stability (or neuroticism, its negative pole), agreeableness, conscientiousness, extraversion, and openness. Additionally, the Big Five taxonomy places families of these traits on a hierarchy with lower-level subdimensions of each Big Five. Personality attributes below the Big Five include meso-level traits referred to as aspects (e.g., DeYoung, Quilty, & Peterson, 2007) and narrower lower-level facets. Aspects and facets that share psychological meaning, and most likely similar etiology, combine to define each Big Five factor.

There are two meaningful higher-order factors above the Big Five (Davies, Connelly, Ones, & Birkland, 2015; DeYoung, 2006; Digman, 1997). Factor Alpha (also referred to as stability or socialization) represents the shared variance among conscientiousness, agreeableness, and emotional stability. Factor Beta (also referred to as plasticity) represents the shared variance between extraversion and openness. Finally, there are some personality attributes that combine features of multiple trait domains and/or multiple levels of the trait hierarchy, referred to as compound traits (Davies et al., 2015; Hough & Ones, 2001). In the following sections, we review relations of CWB with compound traits related to Factor Alpha, other compound traits including psychological capital, social desirability, core self-evaluations, and some maladaptive personality attributes such as Machiavellianism and narcissism. Meta-analytic findings are summarized in Table 6.3.

Big five personality dimensions

Among the Big Five, conscientiousness is the dimension most strongly associated with CWB. Consisting of individual differences in following rules, adhering to socially prescribed norms, being planful, goal- and task-directed, and delaying gratification (John & Srivastava, 1999), it is the Big Five attribute associated with impulse control. Based on over half a dozen meta-analyses, its relations with overall CWB range around $-.30$. It is more highly predictive of organizational CWB (mean $\rho = -.40$) and markedly less predictive of interpersonal CWB (mean $\rho = -.22$). It is related to other subforms of CWB and outcomes such as turnover (mean $\rho = -.23$) and even accident involvement, though meta-analyses for the latter have produced discordant results. Among its facets, dependability appears to yield most promising relations.

Agreeableness is the tendency to understand, empathize with, and cooperate with others (DeYoung, 2011). It has been described as 'a pro-social and communal orientation toward others'

(John & Srivastava, 1999, p. 121). Characteristics such as altruism, nurturance, cooperation, and caring define the positive end of the trait continuum, and antagonism, unfriendliness, hostility, spitefulness, self-centeredness, jealousy, or indifference toward others define the negative end. It includes facets such as cooperation, lack of aggression, nurturance, and modesty (Davies, 2012; John et al., 2008). Descriptive adjectives of the positive pole of agreeableness include sympathetic, kind, and appreciative while negative indicators include faultfinding, cold, and unfriendly. Agreeableness is a good predictor of avoidance of increased counterproductive work behaviors, especially those directed at other individuals (Berry et al., 2007). Meta-analyses summarized in Table 6.3 indicate that agreeableness on average correlates $-.27$ with overall CWB and $-.32$ with organizational CWB, but on average $-.49$ with interpersonal CWB. It displays sizable negative relations with turnover, perhaps due to its positive links to organizational dedication and citizenship behaviors. Aspects and facets of agreeableness are yet to be fully examined in terms of their role in predicting CWB. Anger and aggressive traits are exceptions and have sizable CWB literatures associated with them. The relations for these agreeableness traits are in the (negative) $.32$ to $.43$ range. Little is known about how agreeableness traits relate to specific interpersonal forms of CWB such as violence, incivility, and sexual harassment.

Neuroticism (or a lack of Emotional Stability) describes individual differences in the susceptibility to and frequency of experiencing negative emotions. It subsumes a number of traits including depression, anxiety, negative affectivity, low self-esteem, irritability, skepticism, and moodiness (Birkland & Ones, 2006; DeYoung et al., 2007). Descriptive adjectives characterizing neuroticism include tense, moody, nervous, and anxious. Neuroticism plays a role in reduced job performance (e.g., Barrick, Mount, & Judge, 2001) and organizational citizenship behaviors (Chiaburu, Oh, Berry, Li, & Gardner, 2011). The personality trait of neuroticism is also related to CWB, but the association is weaker than that of conscientiousness and agreeableness. Its relations with organizational and interpersonal CWB are remarkably similar ($\rho = .23$ and mean $\rho = .22$, respectively). It is a potent predictor of turnover (mean $\rho = .21$ across 5 meta-analytic estimates). Unsafe behaviors and accidents/injuries are also notably related to neuroticism. Most neuroticism facet-CWB relations await detailed examination. One exception is for a core trait of the neuroticism domain: negative affect. Its relations with CWB are more potent than global neuroticism,

suggesting that some facets of neuroticism may not be consequential for CWB. Negative affect correlates on average $.35$ with overall CWB and $.32$ with both organizational and interpersonal CWB, respectively. Relations with more specific forms of CWB range between $.14$ (for theft) and $.37$ (for withdrawal).

Extraversion implies an energetic approach toward the social and material world, and subsumes more specific traits such as sociability, activity, assertiveness, sensation seeking, and positive emotionality (Davies, 2012; John et al., 2008). Extraversion comprises the aspects of enthusiasm and assertiveness, which themselves encompass various facets, such as sociability (gregariousness), activity (energy), and dominance (assertiveness) (Davies, Connelly, & Ones, 2009). Adjectives describing the positive pole of extraversion include talkative, assertive, and energetic whereas descriptors of the negative pole include quiet, reserved, detached, and shy. As can be seen in Table 6.3, global extraversion is negligibly related to CWB. However, there are two facets of extraversion that should not be overlooked when seeking to understand CWB. First, its sensation seeking facet, which describes a tendency to seek out excitement and sensations, is related $.27$ with unsafe behavior. Similar relations may exist with other forms of CWB, though these await investigation. Second, positive affect (also referred to as positive emotionality) has shown consistent sizable, negative relations with overall CWB (mean $\rho = -.23$ across 5 meta-analytic estimates), organizational CWB ($\rho = -.23$), and interpersonal CWB ($\rho = -.12$).

Openness describes the breadth, depth, originality, imagination, and complexity of an individual's mental and experiential life (John et al., 2008). Openness subsumes traits such as aestheticism, openness to sensations, non-traditionalism, and introspection (Connelly, Ones, & Chernyshenko, 2014). The positive pole of openness is characterized by the words 'wide interests, imaginative, intelligent, and original' while negative pole descriptors include 'commonplace interests, narrow, shallow, and conventional'. As the summary of meta-analytic relations in Table 6.3 makes clear, second-order sampling error notwithstanding, openness-related personality attributes are unrelated to CWB.

Compound traits related to factor alpha

As the above description details, CWB is best predicted by personality attributes related to conscientiousness, agreeableness, and emotional stability, the same three traits that share Factor

Table 6.3 Relations among psychological individual differences variables and CWB: Summary from meta-analyses

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Neuroticism-Related Traits							
Emotional Stability							
CWB Overall ^{a,1,2}	2,975	12	-.04		-.05	.07	-.17, .07
CWB Overall ^b					-.26		
CWB Overall ^c	1,470	6	-.19		-.25	.10	-.41, -.09
CWB Overall ^d	12,409	25	-.08		-.11	.07	-.23, .01
CWB Overall ^{dt}	1,140	4	-.04		-.05	.07	-.17, .07
CWB Overall ^e	1,903	9			-.09	.10	-.26, .08
CWB Overall (Lack Of) ^f	3,107	15	.04		.06	.14	-.17, .29
CWB Overall ^g	1,624	9	-.12	.04			
CWB Overall ^h	19,722	59			-.24	.14	-.47, -.01
CWB Overall ^{h,5,†}	965	3	-.23		-.33		-.48, -.18
CWB-Organizational ^b	2,300	7	-.19		-.23	.12	-.43, -.03
CWB-Interpersonal ^b	2,842	10	-.20		-.24	.12	-.44, -.04
CWB-Interpersonal ^{b,1}	524	3			-.14		
CWB-Interpersonal ^{b,3}	2,318	7			-.27		
Absenteeism (Lack Of) ^f	2,491	12	-.03		-.04	.19	-.35, .27
Accidents (Lack Of) ^f	2,121	5	.04		.08	.15	-.17, .33
Accidents ^{k,†}	2,346	15	-.06		-.06		
Accidents/Injuries ^{l,†}	5,129	12	-.15		-.19	.19	-.50, .12
Accident Involvement ^{m,†}	1,958	13	-.17		-.28	.22	-.64, .08
Turnover Intentions ⁱ	15,075	41	-.23		-.29	.11	-.47, -.11
Turnover (Lack Of) ^f	554	4	.25		.35	.00	.35, .35
Turnover ^d	93,256	30	-.19		-.21	.06	-.31, -.11
Turnover ^{dt}	1,234	6	-.09		-.10	.00	-.10, -.10
Turnover ⁱ	1,824	19	-.16		-.18	.00	-.18, -.18
Turnover ^{it}	4,814	13	-.19		-.23	.08	-.37, -.09
Unsafe Behavior ^{k,†}	3,498	17	-.12		-.15	.12	-.35, .05
Unsafe Behavior ^{k,6,†}	3,929	19	-.10		-.13	.12	-.33, .07
Withdrawal ^c	1,470	6	-.17		-.22	.12	-.42, -.02
Withdrawal ^{e,4}	2,041	12			-.09	.09	-.24, .06

Table 6.3 Relations among psychological individual differences variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Even Tempered							
CWB Overall ^d	579	2	-.11		-.12	.00	-.12, -.12
Turnover ^d	848	4	-.10		-.11	.06	-.21, -.01
Negative Affect							
CWB Overall ^{a,1,2}	761	5	.16		.19	.01	.17, .21
CWB Overall ^b	4,284	7	.25		.33	.16	.07, .59
CWB Overall ⁿ	11,818	52	.24		.30	.60	-.68, 1.00
CWB Overall ^o	1,607	9			.55		
CWB Overall ^p	4,101	23	.34		.41		
CWB Overall ^q	1,461	8	.25		.30		
CWB Overall ^r	2,017	6	.36		.46	.08	.33, .59
CWB Overall ^s	2,242	8	.29	.05			
CWB Overall ^h	15,568	55			.28	.18	-.02, .58
CWB-Organizational ^b	883	3	.25		.31	.00	.31, .31
CWB-Organizational ⁿ	7,572	33	.18		.20	.51	-.65, 1.00
CWB-Organizational ^s	1,168	4	.24		.28		
CWB-Organizational ^r	1,271	6	.35		.51	.09	.35, .66
CWB-Organizational ^q	1,629	7	.35	.05			
CWB-Interpersonal ^c	883	3	.27		.34	.00	.34, .34
CWB-Interpersonal ⁿ	7,917	32	.26		.32	.33	-.23, .86
CWB-Interpersonal ^s	1,532	5	.22		.29		
CWB-Interpersonal ^r	1,496	8	.24		.34	.00	.34, .34
CWB-Interpersonal ^q	1,629	7	.27	.04			
Abuse ⁿ	818	1	.24		.31		
Production Deviance ⁿ	1,298	6	.23		.30	.33	-.25, .84
Sabotage ⁿ	994	5	.13		.17	.15	-.07, .41
Theft ⁿ	1,018	5	.11		.14	.15	-.10, .39
Withdrawal ^c	2,178	6	.29		.37	.07	.25, .49
Withdrawal ⁿ	2,396	9	.16		.22	.23	-.17, .60

(Continued)

Table 6.3 Relations among psychological individual differences variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Withdrawal ^q	2,650	9	.14		.16		
Turnover Intentions ^c	1,073	4	.32		.40		.00 .40, .40
Turnover Intentions ⁱ	10,484	28	.26		.31		.11 .14, .48
Anger^s							
Unsafe Behavior ^k	3,058	4	.16		.20		.05 .12, .28
Anxiety							
Unsafe Behavior ^k	5,203	8	-.11		-.14		.18 -.44, .16
Impulsiveness							
Unsafe Behavior ^k	2,668	5	.22		.29		.05 .21, .37
Extraversion-Related Traits							
CWB Overall ^{a,1,2}	1,066	7	.03		.04		.13 -.17, .25
CWB Overall ^c	1,140	5	-.16		-.20		.08 -.33, -.07
CWB Overall ^{ii,5}	965	3	-.09		-.13		.30 -.30, .04
CWB Overall ^{cd}	31,737	32	-.03		-.04		.09 -.19, .11
CWB Overall ^e	1,903	9			.03		.08 -.10, .16
CWB Overall (Lack Of) ^f	2,383	12	-.01		-.01		.18 -.31, .29
CWB Overall ^g	1,624	9	.08	.03			
CWB-Organizational ^b	1,836	5	-.07		-.09		.14 -.32, .14
CWB-Interpersonal ^b	2,360	8	.02		.02		.11 -.16, .20
CWB-Interpersonal ^{b,3}	1,836	5			.03		
CWB-Interpersonal ^{b,1}	524	3			.01		
Absenteeism (Lack Of) ^f	1,799	10	-.05		-.08		.25 -.49, .33
Turnover Intentions ⁱ	7,231	25	-.10		-.12		.09 -.27, .03
Turnover ^d	52,383	40	-.07		-.08		.09 -.23, .07
Turnover ⁱ	1,608	18	-.03		-.04		.05 -.12, .04
Turnover ^{it}	4,654	11	-.07		-.09		.08 -.22, .04
Turnover (Lack Of) ^f	554	4	.14		.20		.09 .05, .35
Unsafe Behavior ^k	3,851	14	.06		.08		.10 -.08, .24
Unsafe Behavior ^{k,6}	6,378	20	.08		.10		.11 -.08, .28
Withdrawal ^c	1,140	5	-.16		-.20		.10 -.36, -.04
Withdrawal ^{e,4}	7,248	15			-.03		.06 -.13, .07

Table 6.3 Relations among psychological individual differences variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Accidents ^k	3,018	16	.10		.11		
Accidents (Lack Of) ^f	2,341	7	.02		.04	.20	-.29, .37
Accidents/Injuries ^l	2,083	5	-.06		-.07	.11	-.25, .11
Accident Involvement ^m	1,524	12	-.05		-.09	.33	-.63, .46
Positive Affectivity							
CWB Overall ^c	1,401	3	-.24		-.30	.00	-.30, -.30
CWB Overall ⁿ	3,590	15	-.16		-.19	.22	-.54, .16
CWB Overall ^o	447	2			-.14		
CWB Overall ^p	4,425	23	-.28		-.34		
CWB Overall ^h	7,507	26			-.16	.16	-.42, .10
CWB-Organizational ⁿ	1,903	9	-.21		-.23	.39	-.88, .41
CWB-Interpersonal ⁿ	3,577	12	-.09		-.12	.13	-.33, .09
Turnover Intentions ⁱ	2,577	14	-.14		-.18	.08	-.32, -.04
Withdrawal ^c	1,401	3	-.26		-.32	.00	-.32, -.32
Withdrawal ^q	2,165	7	.05		.05		
Activity							
CWB Overall ^d	18,039	9	-.05		-.07	.10	-.23, .09
Turnover ^d	24,881	10	-.14		-.16	.06	-.26, -.06
Attention Seeking							
CWB Overall ^d	653	3	.13		.15	.00	.15, .15
Turnover ^d	978	7	.00		.01	.15	-.24, .26
Dominance							
CWB Overall ^d	11,372	11	-.02		-.02	.04	-.09, .05
Turnover ^d	19,747	13	.00		.00	.01	-.02, .02
Sensation Seeking							
Unsafe Behavior ^k	12,864	30	.21		.27	.11	.09, .45
Sociability							
CWB Overall ^d	1,344	6	.05		.06	.00	.06, .06
Turnover ^d	1,015	3	-.08		-.09	.00	-.09, -.09
Openness-Related Traits							
CWB Overall ^c	506	3	-.09		-.12	.20	-.45, .21
CWB Overall ^{l,5}	1,427	4	-.10		-.15		

(Continued)

Table 6.3 Relations among psychological individual differences variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
CWB Overall ^d	6,528	31	-.01		-.02	.00	-.02, -.02
CWB Overall ^e	1,903	9			-.07	.05	-.15, .01
CWB Overall ^g	1,624	9	.04	.04			
CWB Overall ^t	12,679	88	-.03		-.04	.07	-.16, .08
CWB Overall ^{a,1,2}	890	6	-.10		-.13	.00	-.13, -.13
CWB Overall ^b					-.08		
CWB Overall (Lack Of) ^f	1,421	8	-.10		-.14	.14	-.37, .09
CWB-Organizational ^b	1,772	5	-.03		-.04	.06	-.14, .06
CWB-Interpersonal ^b	2,360	8	-.07		-.09	.00	-.09, -.09
CWB-Interpersonal ^{b,3}	1,836	5			-.08		
CWB-Interpersonal ^{b,1}	524	3			-.11		
Unsafe Behavior ^k	2,898	10	-.01		-.02		
Absenteeism (Lack Of) ^f	1,339	8	.00		.00	.00	.00, .00
Turnover Intentions ⁱ	3,730	12	.01		.01	.13	-.20, .22
Turnover ^d	5,977	24	-.07		-.08	.05	-.16, .00
Turnover ⁱ	1,563	16	.09		.10	.07	-.02, .22
Turnover ^t	18,029	49	-.05		-.06	.08	-.19, .07
Turnover (Lack Of) ^f	554	4	.11		.14	.00	.14, .14
Accidents ^k	1,633	6	.05		.05		
Accidents (Lack Of) ^f	1,660	5	-.05		-.09	.07	-.21, .03
Accident Involvement ^m	570	7	.29		.50	.63	-.54, 1.00
Aesthetics							
CWB Overall ^d	296	4	-.03		-.03	.00	-.03, -.03
CWB Overall ^t	1,344	12	-.05		-.06	.00	-.06, -.06
Turnover ^d	293	4	.05		.06	.00	.06, .06
Turnover ^t	966	9	.11		.13	.01	.11, .15
Culture							
CWB Overall ^t	4,568	39	-.04		-.06	.00	-.06, -.06
Turnover ^t	9,243	23	-.04		-.05	.08	-.18, .08
Curiosity							
CWB Overall ^d	895	3	-.06		-.07	.00	-.07, -.07

Table 6.3 Relations among psychological individual differences variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
CWB Overall ^t	390	2	-.09		-.11	.00	-.11, -.11
Turnover ^d	1,925	7	-.14		-.16	.04	-.23, -.09
Turnover ^t	399	5	-.12		-.13	.00	-.13, -.13
Depth							
CWB Overall ^t	1,048	89	.02		.03	.06	-.07, .13
Turnover ^{d,t}	109	1	.02		.02		
Ingenuity							
CWB Overall ^t	1,048	8	.04		.05	.00	.05, .05
Intellect							
CWB Overall ^t	1,839	14	.01		.02	.00	.02, .02
Turnover ^t	6,401	12	-.08		-.09	.05	-.17, -.01
Intellectual Efficiency							
CWB Overall ^d	1,555	4	.04		.04	.00	.04, .04
CWB Overall ^t	401	4	.05		.06	.00	.06, .06
Turnover ^d	1,302	2	-.05		-.06	.00	-.06, -.06
Turnover ^t	6,002	7	-.08		-.09	.06	-.19, .01
Tolerance							
CWB Overall ^d	2,282	11	-.03		-.03	.00	-.03, -.03
CWB Overall ^t	2,176	19	-.07		-.10	.00	-.10, -.10
Turnover ^d	1,559	5	-.04		-.05	.00	-.05, -.05
Turnover ^t	8,168	13	-.06		-.07	.05	-.15, .01
Agreeableness-Related Traits							
CWB Overall ^{a,1,2}	2,246	9	-.18		-.22	.18	-.52, .08
CWB Overall ^b					-.44		
CWB Overall ^c	863	4	-.18		-.24	.11	-.42, -.06
CWB Overall ^{i,5}	965	3	-.15		-.21		-.43, .01
CWB Overall ^d	12,519	25	-.15		-.19	.10	-.35, -.03
CWB Overall ^e	2,034	10			-.27	.19	-.58, .04
CWB Overall (Lack Of) ^f	1,299	9	.13		.20	.02	.17, .23
CWB Overall ^g	1,624	9	-.19	.04			
CWB Overall ^h	19,725	66			-.36	.17	-.64, -.08

(Continued)

Table 6.3 Relations among psychological individual differences variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
CWB-Organizational ^b	2,934	8	-.25		-.32	.08	-.45, -.19
CWB-Interpersonal ^b	2,934	8			-.44		
CWB-Interpersonal ^{b,3}	524	3			-.57		
CWB-Interpersonal ^{b,1}	3,336	10	-.36		-.46	.10	-.62, -.30
Unsafe Behavior ^k	4,791	12	-.20		-.26		
Unsafe Behavior ^{k,6}	4,791	12	-.21		-.26	.05	-.34, -.18
Absenteeism (Lack Of) ^f	1,339	8	-.03		-.04	.00	-.04, -.04
Turnover Intentions ⁱ	3,527	10	-.10		-.13	.11	-.31, .05
Turnover ^d	28,728	21	-.09		-.10	.03	-.15, -.05
Turnover ⁱ	1,532	15	-.22		-.25	.11	-.42, -.08
Turnover (Lack Of) ^f	554	4	.16		.22	.00	.22, .22
Withdrawal ^c	863	4	-.12		-.16	.00	-.16, -.16
Withdrawal ^{e,4}	5,510	10			-.04	.05	-.12, .04
Accidents ^k	4,239	9	-.07		-.07		
Accidents (Lack Of) ^f	1,540	4	.00		.01	.04	-.06, .08
Agreeableness – Low							
Accident Involvement ^m	420	7	.36		.61	.00	.61, .61
Aggressive Traits							
CWB Overall ^h	16,238	69			.32	.15	.07, .57
Trait Anger^s							
CWB Overall ^s	1,941	4	.30		.38		
CWB-Organizational ^s	2,032	7	.28		.33		
CWB-Interpersonal ^s	2,648	10	.37		.43		
Altruism							
Unsafe Behavior ^k	3,580	6	-.28		-.35	.05	-.43, -.27
Consideration							
CWB Overall ^d	296	4	-.04		-.05	.00	-.05, -.05
Turnover ^d	366	4	-.03		-.04	.00	-.04, -.04
Cooperation							
CWB Overall ^d	9,516	10	-.18		-.23	.08	-.36, -.10
Turnover ^d	5,716	8	-.07		-.08	.03	-.13, -.03

Table 6.3 Relations among psychological individual differences variables and CWB: Summary from meta-analyses (continued)

Measure	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	90% <i>CI</i>
Selflessness							
CWB Overall ^d	98	1	-.01		-.01		
Turnover ^d	4,512	1	-.07		-.08		
Conscientiousness-Related Traits							
CWB Overall ^{a,1,2}	3,332	13	-.15		-.18	.14	-.41, .05
CWB Overall ^b					-.35		
CWB Overall ^c	2,755	11	-.20		-.26	.21	-.61, .09
CWB Overall ^p	3,280	10	-.29		-.38		
CWB Overall ^{l,5}	1,427	4	-.19		-.28		
CWB Overall ^d	50,385	53	-.18		-.23	.10	-.39, -.07
CWB Overall ^e	2,612	12			-.27	.20	-.59, .05
CWB Overall (Lack Of) ^f	6,276	13	.16		.26	.03	.21, .31
CWB Overall ^g	1,829	10	-.33	.02			
CWB Overall ^h	28,086	96			-.36	.15	-.61, -.11
CWB-Organizational ^b	2,934	8	-.34		-.42	.08	-.55, -.29
CWB-Organizational ^c	1,582	6	-.30		-.37	.08	-.50, -.24
CWB-Interpersonal ^{b,1}	524	3			-.17		
CWB-Interpersonal ^{b,3}	2,934	8			-.24		
CWB-Interpersonal ^b	3,458	11	-.19		-.23	.13	-.44, -.02
CWB-Interpersonal ^c	1,051	4	-.20		-.25	.04	-.32, -.18
Unsafe Behavior ^k	2,898	10	-.18		-.23	.06	-.33, -.13
Unsafe Behavior ^{k,6}	3,995	16	-.21		-.25	.08	-.38, -.12
Absenteeism (Lack Of) ^f	2,155	10	.04		.06	.10	-.10, .22
Accident Involvement ^{m,‡}	1,125	9	-.18		-.30	.33	-.84, .24
Turnover Intention ⁱ	4,315	13	-.12		-.16	.07	-.27, -.05
Turnover ^d	116,505	35	-.15		-.17	.06	-.27, -.07
Turnover ⁱ	1,631	17	-.18		-.20	.01	-.22, -.18
Turnover (Lack Of) ^f	748	5	.23		.31	.00	.31, .31
Withdrawal ^c	2,774	11	-.21		-.27	.23	-.65, .11
Withdrawal ^{e,4}	3,338	15			-.10	.12	-.29, .09

(Continued)

Table 6.3 Relations among psychological individual differences variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Accidents ^k	2,163	9	-.11		-.12		
Accidents (Lack Of) ^f	2,094	6	.03		.06	.10	-.10, .22
Accidents/Injuries ^l	852	4	-.22		-.26	.13	-.47, -.05
Ability to be on Time							
Absenteeism ^u	2,522	5	.05	.06	.08	.05	.00, .16
Lateness ^u	308	2	-.02	.09	-.04	.09	-.19, .11
Achievement							
CWB Overall ^d	18,971	18	-.13		-.17	.08	-.30, -.04
CWB Overall ^v	1,026	13	.00		.00	.05	-.08, .08
Turnover ^d	19,570	11	-.09		-.10	.00	-.10, -.10
Cautiousness							
CWB Overall ^v	2,251	14	-.06		-.11	.15	-.36, .14
Dependability							
CWB Overall ^v	2,195	16	-.21		-.34	.13	-.55, -.13
Order							
CWB Overall ^d	1,433	7	-.12		-.15	.04	-.22, -.08
CWB Overall ^v	1,311	13	-.04		-.07	.15	-.32, .18
Unsafe Behavior ^k	365	2	-.17		-.20	.15	-.45, .05
Turnover ^d	5,236	5	-.08		-.09	.07	-.21, .03
Responsibility							
CWB Overall ^d	294	3	-.01		-.02	.00	-.02, -.02
Turnover ^d	4,512	1	-.07		-.08		
Compound Traits Related to Alpha							
Conditional Reasoning Test of Aggression							
CWB Overall ^w	3,237	17	.16		.16	.23	-.22, .54
CWB Overall ^{w,7}	976	6	.20		.20	.15	-.05, .45
CWB Overall ^{w,8}	2,261	11	.14		.14	.26	-.29, .57
Customer Service Scales							
CWB Overall ^x	740	5			.42	.14	.19, .65
Integrity (Lack Of)[#]							
CWB Overall ^{y,11}	197,717	187	.22		.32	.22	-.04, .68
CWB Overall ^{y,12}	282,544	138	.25		.36	.28	-.10, .82
CWB Overall ^{y,10}	369,581	183	.30		.44	.35	-.14, 1.00

Table 6.3 Relations among psychological individual differences variables and CWB: Summary from meta-analyses (continued)

Measure	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	90% <i>CI</i>
CWB Overall ^{y,6}	312,827	290	.32		.45		.36 −.14, 1.00
CWB Overall ^y	507,688	443	.33		.47		.37 −.14, 1.00
CWB Overall ^{y,9}	219,640	295	.39		.56		.39 −.08, 1.00
CWB Overall ^{y,13}	309,831	255	.41		.58		.40 −.08, 1.00
CWB Overall ^{y,14}	105,369	153	.38		.54		.47 −.23, 1.00
CWB Overall ^{aa,1}	3,645	7	.09		.11		.00 .11, .11
CWB Overall ^{aa,15}	3,420	17	.14		.15		.10 −.01, .31
CWB Overall ^{aa,10}	10,802	16	.18		.22		.12 .02, .42
CWB Overall ^{aa,6}	11,222	34	.35		.43		.13 .22, .64
CWB Overall ^{aa,3}	13,085	43	.33		.42		.13 .21, .63
CWB Overall ^{aa,14}	7,047	45	.38		.45		.18 .15, .75
CWB Overall ^{aa,1,10,12}	5,056	10	.09		.11		.02 .08, .14
Theft ^y	193,631	152	.36		.52		.39 −.12, 1.00
Theft ^{aa}	6,797	25	.23		.33		.11 .15, .51
Theft ^{aa,1,10,12}	1,481	3	.03		.04		.03 −.01, .09
Turnover ^{aa}	24,808	20	.07		.09		.05 .01, .17
Turnover ^{aa,1,10,12}	22,647	13	.06		.09		.05 .01, .17
Turnover (Without Outlier) ^{aa}	6,813	19	.11		.15		.06 .05, .25
Turnover (Involuntary) ^{aa}	8,248	12	.16		.19		.03 .14, .24
Turnover (Voluntary) ^{aa}	17,185	7	.06		.08		.00 .08, .08
Withdrawal ^{aa}	3,989	11	.23		.33		.10 .17, .49
Withdrawal ^{aa,1,10,12}	5,873	5	.12		.15		.00 .15, .15
Substance Abuse ^{aa}	5,106	14	.20		.25		.17 −.03, .53
Substance Abuse (Without Outlier) ^{aa}	3,106	12	.28		.40		.10 .24, .56
Absenteeism (Lack Of) ^y	13,972	28	.14	.14	.20		.19 −.11, .51
Alcohol Abuse ^{z,9}	644	16	.27	.11	.34		.00 .34, .34
Alcohol Abuse ^{z,8}	438	3	.29	.01	.31		.00 .31, .31
Alcohol Abuse ^z	1,402	20	.35	.16	.45		.14 .22, .68
Alcohol Abuse ^{z,10}	320	1	.62				

(Continued)

Table 6.3 Relations among psychological individual differences variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>		<i>SD_ρ</i>	<i>90% CI</i>
Drug Abuse ^{z,10}	21,771	9	.16	.05	.21	■	.00	.21, .21
Drug Abuse ^{z,9}	487	8	.30	.15	.38	■	.08	.25, .51
Drug Abuse ^z	24,192	30	.19	.11	.25	■	.13	.04, .46
Drug Abuse ^{z,8}	1,934	13	.48	.14	.51	■	.15	.26, .76
Substance Abuse ^{z,9}	1,131	24	.28	.13	.36	■	.00	.36, .36
Substance Abuse ^{z,10}	22,091	10	.17	.07	.22	■	.07	.10, .34
Substance Abuse ^{z,8}	2,372	16	.45	.14	.48	■	.14	.25, .71
Substance Abuse ^z	25,594	50	.20	.12	.26	■	.14	.03, .49
Non-Delinquency								
CWB Overall ^d	20,083	13	-.23		-.29	■	.10	-.45, -.13
Turnover ^d	19,492	9	-.12		-.13	■	.05	-.21, -.05
Risk Taking								
Accidents/Injuries ^l	820	3	.16		.20	■	.18	-.10, .50
Self-Control								
CWB Overall ^d	538	4	-.12		-.15	■	.00	-.15, -.15
CWB Overall ^c	941	3	.10		.13	■	.47	-.64, .90
CWB Overall ^h	5,572	23			-.31	■	.26	-.74, .12
Turnover ^d	364	5	.17		.19	■	.17	-.09, .47
Withdrawal ^c	960	3	.05		.06	■	.43	-.65, .77
Stress Tolerance Scales								
CWB Overall ^k	594	5			.42	■	.00	.42, .42
Violence Scales								
CWB Overall ^k	533	4			.46	■	.30	-.03, .95
Virtue								
CWB Overall ^d	1,097	4	-.09		-.12	■	.00	-.12, -.12
Turnover ^d	66,690	1	-.19		-.21	■		
Psychological Capital								
CWB Overall ^{ac}	1,959	7	-.43		-.42	■	.12	-.62, -.22
Turnover Intentions ^{ac}	2,650	5	-.28		-.32	■	.11	-.50, -.14
Optimism								
CWB Overall ^d	899	6	.01		.02	■	.00	.02, .02
Turnover ^d	67,742	9	-.22		-.24	■	.01	-.26, -.22
Social Desirability								
CWB Overall ^{ad,16}	1,479	6	-.03	.12	-.03	■	.11	-.22, .16

Table 6.3 Relations among psychological individual differences variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
CWB Overall ^c	1,190	4	-.06		-.08	.52	-.94, .78
Withdrawal ^c	1,322	5	-.13		-.17	.24	-.56, .22
Core Self-Evaluations							
CWB Overall ^{ag}	4,313	16	-.15		-.17	.15	-.42, .08
CWB Overall ^{ag,1}	3,530	10	-.16		-.19	.12	-.39, .01
CWB Overall ^{ag,3}	674	5	.00		-.01	.17	-.29, .27
CWB-Organizational ^{ag}	1,432	8	-.24		-.28	.08	-.41, -.15
CWB-Interpersonal ^{ag}	3,570	11	-.13		-.16	.14	-.39, .07
Turnover Intentions ^{ag}	2,911	11	-.22		-.26	.08	-.39, -.13
Locus of Control							
Unethical Behavior ^{af}	713	4	.22		.25		
Absenteeism ^{ah,4}	950	2	-.04	.00			
Turnover Intentions ^{ah,4}	3,303	10	-.14	.09			
Accidents/Injuries ^l	2,446	4	-.20		-.26	.03	-.31, -.21
Locus of Control – Work							
Absenteeism ^{ah,4}	785	4	-.17	.12			
Turnover Intentions ^{ah,4}	3,664	19	-.20	.11			
Self-Esteem							
CWB Overall ^{ai}	5,135	21	-.22		-.26	.19	-.57, .05
CWB Overall (Without Outlier) ^{ai}	3,473	20	-.14		-.16	.16	-.42, .10
Self-Esteem – Global Measures							
CWB Overall ^{ai}	3,564	14	-.26		-.30	.18	-.60, .00
CWB Overall (Without Outlier) ^{ai}	1,902	13	-.14		-.16	.15	-.41, .09
Self-Esteem – Organizational							
CWB Overall ^{ai}	944	4	-.12		-.14	.00	-.14, -.14
Big Five Composite							
Turnover Intentions ⁱ					-.33		
Turnover ^l					-.32		
Maladaptive Personality							
Machiavellianism							
CWB Overall ^{ae}	2,546	13	.20		.25		
Unethical Behavior ^{af}	546	4	.21	.14	.25	.18	-.05, .55

(Continued)

Table 6.3 Relations among psychological individual differences variables and CWB: Summary from meta-analyses (continued)

Measure	<i>N</i>	<i>k</i>	<i>r</i> _{obs}	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	90% CI
Narcissism							
CWB Overall ^{ae}	2,708	9	.35		.43		
CWB Overall ^{ag}	4,424	16	.28		.32		.30 −.17, .81
CWB Overall ^{ag,17}	2,854	12	.16		.19		.14 −.04, .42
CWB Overall (Without Outlier) ^{ag}	3,600	15	.20		.23		.24 −.16, .62
Psychopathy							
CWB Overall ^{ae}	6,058	27	.06		.07		
Cognitive Ability							
CWB Overall ^{aj,2}	12,074	35	−.02		−.02		.18 −.32, .28
CWB Overall – Self-reported ^{aj,2}	6,700	19	.03		.05		.13 −.16, .26
CWB Overall – Supervisor-rated ^{aj,2}	678	4	−.04		−.08		.14 −.31, .15
CWB Overall – Objective records ^{aj,2}	4,696	12	−.08		−.12		.16 −.38, .14
CWB-Organizational ^{aj,2}	1,854	7	−.11		−.20		.17 −.48, .08
CWB-Interpersonal ^{aj,2}	1,462	4	−.03		−.09		.18 −.39, .21
Turnover ^{ak}	6,062	7	.01		.02		
Cognitive Moral Development							
Unethical Behavior ^{af}	1,272	10	−.13		−.15		.08 −.28, −.02
Safety Motivation							
Accidents/Injuries ^l	911	2	−.16		−.20		.04 −.27, −.13
Safety Knowledge							
Accidents/Injuries ^l	461	3	−.07		−.11		.17 −.39, .17

Note. *N* = total sample size; *k* = number of effect sizes; *r*_{obs} = mean, sample size-weighted correlation; *SD_r* = standard deviation of *r*; *ρ* = meta-analytic correlation – see numerical superscripts for details on criterion measurement and corrections applied; *SD_ρ* = standard deviation of *ρ*; CI = credibility interval. Values for CI were computed when sources did not originally report them but provided *ρ* and *SD_ρ*. Data bars for *ρ* are scaled from .00 to 1.00 and reference absolute values; gray bars indicate negative and black bars indicate positive mean effects. Data sources: ^a Berry, Carpenter, & Barratt (2012); ^b Berry, Ones, & Sackett (2007); ^c Carpenter & Berry (2014); ^d Drasgow et al. (2012) – the rows marked with [†] for this source were for Adjustment scales; ^e Pace (2008); ^f Salgado (2002); ^g Sulea, Maricutoiu, Dumitru, & Pitariu (2010); ^h Taylor (2012); ⁱ Zimmerman (2008) – the rows marked with [†] for this source did not include measures of negative affect; ^j Darr (2011); ^k Beus, Dhanani, & McCord (2015); ^l Christian et al. (2009); ^m Clarke & Robertson (2005); ⁿ Cochran (2014); ^o Colquitt et al. (2013); ^p Dalal (2005); ^q Kaplan et al. (2009); ^r Pitariu et al. (2008); ^s Herscovis et al. (2007); ^t Woo et al. (2014); ^u Lau, Au, & Ho (2003); ^v Dudley et al. (2006); ^w Berry, Sackett, & Tobares (2010); ^x Ones & Viswesvaran (2001a); ^y Ones, Viswesvaran, & Schmidt (2003); ^z Schmidt, Viswesvaran, & Ones (1997); ^{aa} Van Iddekinge et al. (2012); ^{ab} McDaniel & Jones (1988); ^{ac} Avey, Reichard, Luthans, & Mhatre (2011); ^{ad} Ones, Viswesvaran, & Reiss (1996); ^{ae} O'Boyle et al. (2012); ^{af} Kish-Gephart, Harrison, & Treviño (2010); ^{ag} Chang et al. (2012); ^{ah} Wang, Bowling, & Eschleman (2010); ^{ai} Whelpley & McDaniel (2016); ^{aj} Gonzalez-Mulé, Mount, & Oh (2014); ^{ak} Griffeth, Hom, & Gaertner (2000). [†] Data/results for a measure that was reverse-scored; effect sizes and CI have been reversed for consistent presentation. [§] Anger comprised variances from both emotional stability and agreeableness; see the respective other section of this table for additional results.

[#] Includes results for both over- and personality-based integrity tests combined. ¹ other-rated; ² corrected for indirect range restriction; ³ self-rated; ⁴ not corrected for measurement error; ⁵ military sample; ⁶ broad measure; ⁷ non-student sample; ⁸ student sample; ⁹ concurrent; ¹⁰ applicant; ¹¹ externally detected CWB; ¹² predictive; ¹³ admissions; ¹⁴ incumbents; ¹⁵ employee records; ¹⁶ corrected for measurement error in predictor only; ¹⁷ npj only; ¹⁸ without outlier.

Alpha (stability, socialization) at their common core. Accordingly, personality constructs that are indicators of Factor Alpha may be expected to be especially potent in explaining CWB, more so than each of its constituent Big Five factors. Indeed, this is the case. Integrity tests predict overall CWB better than conscientiousness, agreeableness, or emotional stability. Across 15 meta-analytic estimates, the mean ρ is .37 (as reflected in Table 6.3, many integrity tests, especially overt ones, are scored such that higher scores indicate dishonesty, thus the positive relation with CWB). Integrity test validities have been examined for many specific forms of CWB (see Viswesvaran, 2016, for a summary). Unsurprisingly, validities are substantial and consequential for predicting, explaining, and reducing CWB in organizations.

Other compound personality traits that assess Factor Alpha include customer service scales (Ones & Viswesvaran, 2008), violence scales (Ones & Viswesvaran, 2001b), drug and alcohol scales (Ones & Viswesvaran, 2001a), and stress tolerance scales (Ones & Viswesvaran, 2011). Relationships of these scales with CWB and its facets tend to be among the strongest for individual differences traits. Relations with self-control, another hypothesized indicator of Factor Alpha, appears to follow the same pattern, though with more variable findings.

Other compound traits

A handful of other compound personality attributes have been examined in relation to CWB. These include adaptive personality variables such as psychological capital (composed of self-efficacy, optimism, hope, and resiliency), optimism, and core self-evaluations (including locus of control) as well as 'maladaptive' (cf. Dilchert, Ones, & Krueger, 2014) personality constructs such as Machiavellianism, narcissism, and psychopathy. The evidentiary bases for the validity of these constructs with CWB is still evolving and accumulating. However, the findings for core self-evaluations thus far parallel those for emotional stability. The findings for psychological capital are stronger than expected, given that emotional stability and extraversion-related traits comprise psychological capital. About a dozen primary studies, summarized in multiple meta-analytic investigations, have examined the relations of the maladaptive traits of Machiavellianism and narcissism with CWB. Machiavellianism appears to be a solid predictor of overall CWB ($\rho = .25$). Relations for narcissism are in the same range, but more variable (ρ s range .19 to .43) for overall CWB.

Cognitive ability

Scholars in criminology and related disciplines have long posited that (lower) cognitive ability is associated with criminal behaviors, and have established the relationship across samples and societies, including in longitudinal research designs that allow inferences about causality (e.g., Denno, 1990; Erickson, 1929; Gibson & West, 1970; Menard & Morse, 1984; Moffitt, 1990; Moffitt & Silva, 1988; Lynam, Moffitt, & Stouthamer-Loeber, 1993; Stattin & Klackenberglarsson, 1993). Estimates of differences in cognitive ability between criminal and non-criminal samples range from .80 to 1.0 standard deviation units (Jensen, 1980). Correlations between cognitive ability and crime are in the .30 to .40 range (e.g., Hirshi & Hindelang, 1997; Jensen, 1998; Wilson & Herrnstein, 1998), depending on the severity and frequency (e.g., habituality) of the crime categories examined, as well as the range of cognitive ability exhibited by the respective samples. The extensions of these findings to the CWB literature have received little attention.

Theoretically, cognitive ability should have an inhibitory effect that averts impulses to engage in CWB and stops individuals from engaging in CWB. 'Individuals of above average and high intelligence possess enough foresight to consider possible consequences of their actions and subsequently choose those most beneficial to them' (Dilchert, Ones, Davis, & Rostow, 2007, p. 618). Limited time horizons (Lubinski, 2000) and inability to delay gratification (Funder & Block, 1989) may underlie the increases in disinhibition among individuals of lower cognitive capacity.

Another perspective about the inhibitory role of cognitive ability is offered by Moffitt (1990) who implicates a knowledge-based mechanism. The process of socialization (i.e., learning to behave in ways acceptable to society) involves learning, especially learning that requires the use of verbal abilities. Comprehension of abstract symbols and cues is also essential for socialization. Individuals lower on cognitive ability may fail to learn rules of society and norms as well as the real consequences of counterproductive (and criminal) behavior. This explanatory mechanism for the cognitive ability-counterproductivity relationship is corroborated by the stronger cognitive ability-crime relation for verbal measures of cognitive ability compared with nonverbal measures (Moffitt, 1990).

We should also note that there may be a reverse causal relation between some forms of counterproductivity and later declines in cognitive ability. Some forms of deviance may have negative consequences for individuals' cognitive capacities. While this is obvious for physical injuries experienced as a result of committing crimes (e.g., head trauma),

a more common and worrisome mechanism might be declines in cognitive ability that result from pervasive forms of self-directed counterproductivity such as drug and alcohol abuse (e.g., Parsons & Nixon, 1998; Pfefferbaum, Lim, Zipursky et al., 1992).

Although cognitive ability is a key individual differences characteristic that predicts and explains workplace behavior, the body of ability-CWB literature is still meager. A couple of early investigations in the IWO literature linked low ability to specific CWB such as accidents (e.g., Brown & Ghiselli, 1947). But the first thorough, contemporary investigation of the cognitive ability-CWB link was reported by Dilchert et al. (2007) who showed that scores on a cognitive ability test were negatively predictive of overall, as well as organizational and interpersonal CWB (operational validities in the $-.30$ s). The methodological strength of this study (true predictive validity investigation with no direct selection on the predictor, using objective CWB counts) is still unmatched in light of empirical and meta-analytical research that has followed. A meta-analysis summarizing the cognitive ability-CWB relations (Gonzalez-Mulé, Mount, & Oh, 2014) indicates negligibly small relations with overall CWB, reflecting the shortcomings of contributing studies which often use single-item or otherwise deficient measures of CWB. Results of cognitive ability-CWB relations are also summarized in Table 6.3.

Methodological problems in research on the cognitive ability-CWB relationship are mostly found on the criterion measurement side, as many studies poorly operationalize CWB. Several studies have artificially dichotomized criterion measurement (e.g., Cuttler & Muchinsky, 2006; Daley, 1978). More importantly, single item measures of CWB (e.g., number of disciplinary incidents; see Shaver, 1980) and *outcomes* of CWB rather than behavior itself (e.g., number of complaints, disciplinary actions; see Borman, 1991; Ford & Kraiger, 1993; Hooper, 1988) are the norm. Counterproductive behaviors should be distinguished from outcomes such as disciplinary actions because many counterproductive outcomes are partially due to factors other than the individual's direct behavior (e.g., disciplinary policies of the organization). While some outcome measures might be useful (distal) indicators of behaviors, we also note that CWB outcomes are typically construct deficient. Less severe forms of counterproductivity (e.g., spreading rumors) as well as less detectable or traceable forms may not be fully represented in outcome measures. These deficiencies likely result in underestimation of the cognitive ability-CWB relationship unless a large number of outcomes reflecting both minor and

severe forms of CWB can be combined in a composite measure. Another source of misestimation of the cognitive ability-CWB relation may arise from the self-report nature of CWB criteria used. Although personality-CWB relations are stronger for self-reported CWB than objective records or other ratings, the same does not appear to hold for cognitive ability. The relationship between cognitive ability and objective non-self-rated CWB is stronger than the correlation with self-reported CWB (p s = $-.12$ and $.05$, respectively; Gonzalez-Mulé et al., 2014). Cognitive ability relations are stronger with objective crime than self-reported crime relations as well (Hirschi & Hindelang, 1977). Cognitive ability is likely causally related to avoidance of CWB. Both impulse control, gained through socialization and schooling, and knowledge acquisition likely explain the inhibitory effect of cognitive ability in the counterproductivity domain.

Influences of States on CWB

As discussed above, the present literature on predictors of CWB has predominantly targeted enduring dispositional characteristics, or traits, as predictors. However, evidence of within-person variation in counterproductivity has sparked interest in the role of states in predicting CWB. Research on states sheds light on the mechanisms underlying the occurrence of CWB while also guiding future measurement. If employees' CWB is highly dependent on a fleeting emotion, for example, then such stimuli should be considered in other CWB studies where behaviors might otherwise be assumed consistent.

Van Hooff and van Hooff (2014) uniquely combined context and emotions in their investigation of work-related boredom. Attempting to cope with their situations, bored employees engaged in relatively minor dysfunctional behaviors that the researchers labeled 'bored behaviors'. However, because bored behaviors such as working slowly or taking extra breaks did not improve the employees' work conditions, they proved ineffective coping mechanisms. Thus, employees proceeded from bored behaviors to more severe CWB to address their negative emotions. The study then sought to examine the effects of proactive behaviors employees might take to counteract their boredom. They found that bored employees who engaged in job crafting, by acting to increase either their structural job resources or their challenging demands, exhibited fewer bored behaviors, thereby weakening the link between their experiences of work-related boredom and dysfunctional reactions to it. As employees are

continually becoming accustomed to more stimulating environments, the negative implications of boredom will likely become more prominent for CWB research in the future.

While research on boredom is nascent, many studies have explored other forms of state affect and emotions in relation to job performance. Meta-analytic results demonstrate that, overall, emotions positively relate to behaviors of similar valence. Positive affect positively influences task performance and OCB while negatively influencing CWB. Conversely, negative affect positively influences CWB while negatively influencing task performance (Shockley, Ispas, Rossi, & Levine, 2012). State negative affect also exhibits moderate to strong relationships with CWB in both short- and long-term investigations ($ps = .57$ and $.39$, respectively). Discrete negative emotions including anxiety, state frustration, anger, sadness, state hostility, envy, and guilt moderately positively relate to CWB (ps range from $.18$ to $.39$). Lastly, positive state affect, state attentiveness, trait attentiveness, and trait pride, all negatively predict CWB ($ps = -.25$, $-.17$, $-.19$, and $-.12$, respectively). These relationships demonstrate the influence of state affect on CWB and clearly indicate the importance of exploration into dynamic predictors of employee performance.

One of the primary studies included in Shockley and colleagues' meta-analysis integrated both situational and individual differences into a study of CWB. Using an experience sampling method to assess 231 individuals across 25 days, J. Yang and Diefendorff (2009) found that negative emotions mediate the relationships between CWB and several of its established predictors. Essentially, employees experienced various triggers of negative emotions, which then led to CWB. Negative emotions partially mediated the relationship between perceived ambiguity and organizational CWB while fully mediating CWB's relationship with both supervisor interpersonal injustice and customer interpersonal injustice. The authors also considered the role of trait predictors on emotional states. Individuals high on trait negative affect exhibited more negative emotions in response to supervisor interpersonal injustice, while conscientiousness and agreeableness weakened the link between negative emotions and CWB. Although these findings provide insight into the role of emotions in CWB, the authors also emphasize the need for more integrative works that consider the potential interactive effects of situational and individual predictors.

Addressing such calls for integrative research, Khan, Quratulain, and Bell (2014) examined the interaction between one specific emotion, episodic

envy, and justice on certain types of CWB. Results indicated that when employees felt envious of others and believed an event to be *fair*, they blamed themselves for the outcome (self-attribution) and engaged in CWB targeted toward the individuals they envied. These results held whether their perceptions of justice were based on their own experiences or those of the colleagues they envied. These authors suggest that organizations have prioritized justice in the workplace to avoid known negative outcomes of perceived injustice; however, practitioners and researchers have yet to explore potential negative effects of perceived justice and ways to reduce them.

In sum, in addition to the wealth of knowledge on trait predictors of CWB, evidence now demonstrates that states, particularly emotions, influence CWB. Trait predictors have yielded implications for personnel selection, but new findings on state influences are particularly relevant to understanding and reducing CWB among existing employees. Future research into these dynamic stimuli will help guide such practical applications. Additionally, evidence of state influences on CWB, and especially intraindividual variation, calls into question the prevalent assumption that employee CWB levels assessed once are relatively stable. To best answer these questions, future studies should consider how much employee CWB truly fluctuates as a result of these, and other, dynamic stimuli. Further studies should also follow the path of J. Yang and Diefendorff (2009) in attempting to integrate new developments in state research with existing knowledge of stable predictors. For example, individuals high in neuroticism may experience more fluctuation in their emotions and therefore exhibit greater variation in their CWB levels. Emotions might also be more responsible for some types of CWB than others. The scholarly literature addressing state influences on CWB is young and ripe with questions requiring empirical answers.

Attitudes

Work-related attitudes have been investigated in the form of several discrete constructs, such as job satisfaction, organizational commitment, perceived organizational support, and many more (Credé, 2005; Dalal & Credé, 2013; Newman, Harrison, Carpenter, & Rariden, 2016). Meta-analyses show meaningful relationships between job attitudes and CWB. Meta-analytic estimates demonstrate a substantial bivariate relationship between job satisfaction and CWB ($p = -.37$) and between organizational commitment and CWB (Dalal, 2005). Primary studies have found similar observed relationships for perceived organizational support

($r = -.30$; S. K. Nielsen, 2006), employee attitudinal engagement ($r = -.20$; Dalal, Baysinger, Brummel, & LeBreton, 2012), and job involvement ($r = -.07$; Dalal et al., 2012).

Recognizing that redundancies between work attitude constructs exist, Newman, Joseph, and Hulin (2010) built off prior empirical work (Credé, 2005; Harrison, Newman, & Roth, 2006) to establish a general factor of job attitudes which they label 'A-factor'. Their meta-analytic work examines the relationship between this A-factor and an exogenous latent general factor of performance, which they call behavioral engagement. Notably, they only included withdrawal behaviors (i.e., turnover, absence, and lateness) as a latent indicator for the general factor of performance and did not include overall CWB in their model. Dalal and colleagues (2012) similarly recognized the construct redundancies in job attitudes but employed relative importance analyses to determine which job attitude is most important in the prediction of CWB. Due to extreme multicollinearity issues, the influential impact of measurement error (Tonidandel & LeBreton, 2011), and established mathematical deficiencies in relative importance (Thomas, Zumbo, Kwan, & Schweitzer, 2014), a latent model of the common variance may have provided more information than the relative importance analysis.

Decades of social psychology research suggest that attitudes may be formed as appraisals of any attitudinal object (D. T. Campbell, 1963). Previously, we have focused on the entire organization or the job itself as the attitudinal object, but employees may form attitudes, whether explicitly or implicitly, toward counterproductivity itself. Implicit attitudes are automatic and activated subconsciously (Greenwald et al., 2002), whereas explicit attitudes are conscious and therefore assessed via overt measures such as integrity tests (Ones et al., 1993). Demonstrating the utility of implicit attitudes, Jost et al. (2009) examined ten studies in which implicit attitudes predicted the presence of stereotypes when explicit measures did not. Implicit attitudes may also meaningfully relate to CWB. Preliminary evidence from Law and Zhou (2014) suggests that implicit attitudes toward CWB are weakly related to self-reported CWB ($r = .14$) but are moderately related to supervisor-reported CWB ($r = .27$). Further still, hierarchical regression demonstrates a substantive incremental prediction of supervisor-rated CWB beyond explicit attitudes toward CWB ($\Delta R^2 = .09$). The model only assessed the incremental validity of implicit attitudes beyond explicit attitudes and measures of *supervisor's* positive and negative affectivity, so future research should examine if implicit attitudes toward CWB

can incrementally predict the occurrence of CWB beyond other variables in a selection context.

Attitudinal variables and CWB:

Review of meta-analytic findings

Several categories of attitudinal variables have been examined in connection with CWB. Not surprisingly, most studied links have been with withdrawal constructs (e.g., absenteeism, lateness) though a few meta-analyses have also reported relationships with overall CWB. Attitudinal variables examined in meta-analyses include job satisfaction, job involvement, organizational commitment, fit, and a handful of other less widely examined affective variables (e.g., psychological contract breach, organizational cynicism). Meta-analytic results for attitudinal variables can be found in Table 6.4.

Judge and colleagues describe the relationship between job satisfaction and job performance as 'one of the most venerable research traditions in industrial-organizational psychology' (Judge, Thoresen, Bono, & Patton, 2001, p. 376), and a recent survey of the *Academy of Management Journal* Editorial Board found that job satisfaction is among the most influential and highly cited constructs in the OB/HR literature (Newman et al., 2016). Overall CWB correlates, on average, $-.27$ with overall job satisfaction, indicating that dissatisfied individuals are prone to engaging in CWB. Both organizational CWB, interpersonal CWB, and unethical behavior demonstrate similar relationships with overall job satisfaction. The handful of specific CWB that have been examined in relation to overall job satisfaction demonstrate effects of varied magnitude, typically ranging from $-.10$ to $-.30$, with especially sizable links to withdrawal constructs such as turnover.

Specific facets of job satisfaction have also been investigated in relation to withdrawal components of CWB. Satisfaction with work is most closely related to turnover (average $\rho = -.23$). Pay satisfaction relates most weakly to turnover ($\rho = -.08$). Satisfaction with coworkers, promotion, and supervisors each demonstrate small negative relationships with turnover (ρ s range from $-.12$ to $-.16$). Comparable relationships are exhibited between lateness and satisfaction with pay, promotions, supervisor, coworkers, and work (ρ s ranged from $-.14$ to $-.24$). Facets of satisfaction are much more weakly related to absenteeism (ρ s from $-.03$ to $-.10$, except for satisfaction with work; $\rho = -.15$). No meta-analytic study has addressed specific forms of job satisfaction with other non-withdrawal manifestations of CWB.

Considering the role of dissatisfaction on CWB, job involvement also appears relevant. Indeed, job-involved individuals appear to lose

Table 6.4 Relations among attitudinal variables and CWB: Summary from meta-analyses

Measure	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	90% <i>CI</i>
Satisfaction							
Job Satisfaction – Overall							
CWB Overall ^m	874	3	-.29		-.33	.01	-.35, -.31
CWB Overall ^{n1,3}	2,231	13	-.19		-.21	.04	-.28, -.14
CWB Overall ^a	14,139	21	-.24		-.30	.09	-.45, -.15
CWB Overall ^c	6,106	25	-.29		-.37		
CWB Overall ⁱ	81,350	208			-.14	.18	-.44, .16
CWB-Organizational ^a	8,542	12	-.21		-.26	.03	-.31, -.21
CWB-Organizational ^o	693	4	-.36	.06			
CWB-Organizational ^s	1,345	6	.31		-.37		
CWB-Interpersonal ^s	2,209	9	.14		-.18		
CWB-Interpersonal ^a	3,063	8	-.20		-.24	.07	-.36, -.12
CWB-Interpersonal ^c	693	4	-.20	.08			
Theft ^p	9,175	3	-.08	.01	.09	.01	.07, .11
Production Deviance ^p	9,175	3	-.14	.02	-.16	.02	-.19, -.13
Unethical Behavior ^q	3,180	15	-.23		-.28		
Absenteeism ^{ad}		114	-.15				
Absenteeism (Frequency) ^{ad}		40	-.18				
Absenteeism (Duration) ^{ad}		74	-.09				
Lateness ^p	501	4	-.08	.13	-.07	.13	-.28, .14
Lateness ^f	3,767	15	-.09	.16	-.11		
Turnover Intentions ^a	6,410	4	-.21		-.26	.11	-.44, -.08
Turnover Intentions ^m	12,618	31	-.52		-.65	.16	-.91, -.39
Turnover Intentions/Withdrawal Cogn. ^h	35,494	88	-.48		-.58	.03	-.64, -.52
Turnover ^h	13,722	49	-.14		-.25	.02	-.28, -.23
Turnover ⁱ	9,732	29	-.25	.01	-.28	.02	-.31, -.25
Turnover ^m	3,818	7	-.14		-.15	.08	-.28, -.02
Turnover ^r	24,566	67	-.17		-.22		
Withdrawal ^a	12,033	20	-.40		-.49	.23	-.87, -.11
Withdrawal ^{d,4}	1,823	7	-.46				
Alcohol Abuse ^p	1,417	2	-.03	.04	-.06	.04	-.13, .01

(Continued)

Table 6.4 Relations among attitudinal variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Job Satisfaction – Coworkers							
Lateness ^f	950	7	-.13	.18	-.16		
Lateness ^{u,5}	312	4	-.06		-.07		
Absenteeism ^{u,5}	229	2	-.06		-.07		
Absenteeism (Sick Days) ^{u,5}	428	5	-.08		-.09		
Intention to Quit ^{u,5}	3,990	12	-.21		-.26		
Prewithdrawal Cognitions ^{u,5}	1,249	2	-.24		-.29		
Turnover ^{u,5}	625	5	-.17		-.18		
Turnover ^f	1,606	13	-.01		-.13		
Job Satisfaction – Pay							
Lateness ^f	976	7	-.17	.10	-.22		
Lateness ^{u,5}	322	4	-.16		-.20		
Absenteeism ^v	2,257	22	-.05	.12	-.05	.08	-.18, .08
Absenteeism ^{u,5}	438	5	-.09		-.11		
Absenteeism (Sick Days) ^{u,5}	239	2	-.04		-.05		
Intention to Quit ^u	137	2	-.23	.14	-.29	.20	-.62, .04
Turnover Intention ^v	15,983	37	-.21		-.31		
Prewithdrawal Cognitions ^u	1,344	3	-.31		-.42		
Turnover ^f	4,425	18	-.06		-.08		
Job Satisfaction – Promotion							
Lateness ^f	401	4	-.25	.13	-.28		
Lateness ^{u,5}	300	4	-.17		-.20		
Absenteeism ^{u,5}	416	5	-.12		-.14		
Absenteeism (Sick Days) ^{u,5}	217	2	-.05		-.06		
Intention to Quit ^{u,5}	1,371	4	-.28		-.35		
Prewithdrawal Cognitions ^{u,5}	1,249	2	-.27		-.33		
Turnover ^{u,5}	822	6	-.15		-.16		
Turnover (Voluntary) ^t	2,205	13	-.07	.01	-.07	.01	-.09, -.05

Table 6.4 Relations among attitudinal variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Job Satisfaction – Supervision							
Lateness ^u	149	2	–.16		–.18		
Absenteeism ^{u,5}	265	3	.01		.02		
Absenteeism (Sick Days) ^{u,5}	230	2	–.06		–.07		
Intention to Quit ^{u,5}	3,826	11	–.25		–.31		
Prewithdrawal Cognitions ^{u,5}	1,754	5	–.30		–.37		
Turnover ^{u,5}	2,241	8	–.12		–.14		
Turnover ^r	3,333	16	–.01		–.13		
Job Satisfaction – Work							
Lateness	300	4	–.18		–.22		
Absenteeism ^{u,5}	534	6	–.12		–.14		
Absenteeism (Sick Days) ^{u,5}	1,495	4	–.13		–.16		
Intention to Quit ^{u,5}	4,836	16	–.40		–.50		
Prewithdrawal Cognitions ^{u,5}	1,871	5	–.43		–.53		
Turnover ^{u,5}	3,205	13	–.24		–.27		
Turnover ⁱ	2,622	15	–.28	.02	–.31	.03	–.36, –.26
Turnover ^r	9,859	32	–.14		–.19		
Job Involvement							
CWB Overall ^l	10,062	34			–.09	.10	–.25, .07
Absenteeism (Frequency) ^g	1,148	4	–.28	.01	–.43		
Absenteeism (Time Lost) ^g	1,076	7	–.10	–.25	–.17		
Turnover ^r	7,666	16	–.08		–.12		
Commitment							
Organizational Commitment							
CWB Overall ^a	4,998	9	–.20		–.25		–.38, –.13
CWB Overall ^b	659	3			–.24		
CWB Overall ^c	5,582	22	–.28		–.36		
Withdrawal ^a	2,860	8	–.24		–.30	.30	–.79, .19
Withdrawal ^d	2,087	7	–.31	.17			
Lateness ^e	1,485	6	–.11		–.12	.06	–.21, –.01
Lateness ^f	3,140	8	–.27	.02	–.29		

(Continued)

Table 6.4 Relations among attitudinal variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	ρ	<i>SD_ρ</i>	90% <i>CI</i>
Absenteeism ^e	4,005	23	.12	–.10		.02	–.14, –.06
Absenteeism (Time Lost) ^g	1,117	11	–.07	–.12		.02	–.15, –.09
Absenteeism (Frequency) ^g	1,343	6	–.15	–.23		.02	–.26, –.20
Turnover Intentions/Withdrawal Cogn. ^h	13,829	51	–.46	–.54		.02	–.57, –.51
Intention to Search ^e	1,513	5	–.48	–.60		.18	–.89, –.31
Intention to Quit ^e	14,080	36	–.41	–.46		.18	–.76, –.17
Turnover ^h	5,021	25	–.20	–.33		.02	–.36, –.31
Turnover ⁱ	2,517	10	–.36	.03		.03	–.43, –.33
Turnover ^e	8,197	26	–.25	–.28		.14	–.50, –.05
Organizational Commitment – Affective							
CWB Overall ^l	12,571	46		–.12		.20	–.45, .21
Absenteeism (Voluntary) ^k	2,108	4	.06	–.09		.00	–.09, –.09
Absenteeism (Involuntary) ^k	1,743	7	.08	–.22		.00	–.22, –.22
Absenteeism (Composite) ^k	3,543	10	.09	–.15		.04	–.21, –.09
Turnover Intentions ^k	8,724	24	.19	–.51		.18	–.81, –.21
Turnover Intentions/Withdrawal Cogn. ^k	17,282	51	.15	–.56		.21	–.91, –.21
Withdrawal Cognitions ^k	10,246	33	.22	–.58		.24	–.97, –.19
Turnover ^k	2,636	8	.25	–.17		.14	–.40, .06
Organizational Commitment – Continuance							
Absenteeism (Voluntary) ^k	1,695	3	.06	.06			.06, .06
Absenteeism (Involuntary) ^k	620	4	.10	.04			.04, .04
Absenteeism (Composite) ^k	2,301	7	.05	.06			.06, .06
Turnover Intentions ^k	6,844	17	.18	–.17			–.45, .12
Turnover Intentions/Withdrawal Cogn. ^k	8,066	27	.17	–.20		.15	–.44, .04
Withdrawal Cognitions ^k	13,590	39	.16	–.18		.15	–.43, .07
Turnover ^k	1,933	6	.15	–.10		.14	–.33, .13
Organizational Commitment – Normative							
Absenteeism (Composite) ^k	770	4	.02	.05		.00	.05, .05
Turnover Intentions ^k	5,855	12	.17	–.39		.16	–.65, –.13
Turnover Intentions/Withdrawal Cogn. ^k	9,645	25	.26	–.33		.25	–.74, .08
Withdrawal Cognitions ^k	5,249	18	.18	–.30		.16	–.57, –.03
Turnover ^k	970	4	.13	–.16		.11	–.34, .02

Table 6.4 Relations among attitudinal variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	ρ	<i>SD_p</i>	<i>90% CI</i>
Occupational Commitment							
Turnover Intention (Organizational) ^l	8,739	27	-.25		-.30	.20	-.63, .03
Turnover Intention (Occupational) ^l	5,995	18	-.52		-.62	.20	-.95, -.29
Turnover ^l	1,645	8	-.12		-.21	.00	-.21, -.21
Fit							
Person–Organization							
Absenteeism ^{ab}	1,370	7	-.05		-.05	.06	-.15, .05
Intention to Quit ^{ab}	34,276	43	-.29		-.35	.17	-.62, -.08
Turnover ^{ab}	2,157	10	-.13		-.14	.12	-.34, .06
Person–Job							
Intention to Quit ^{ab}	3,849	16	-.37		-.46	.12	-.66, -.26
Turnover ^{ab}	1,496	8	-.07		-.08	.06	-.18, .02
Person–Group							
Intention to Quit ^{ab}	943	6	-.17		-.22	.03	-.27, -.17
Misc.							
Expected Utility of Withdrawal							
Turnover ^r	1,303	7	.21		.28		
Job Attitudes							
Lateness ^f	5,332	19	-.16		-.21		
Accidents/Injuries ^w	20,078	9	-.13		-.17	.05	-.25, -.09
Met Expectations							
Turnover ^r	1,486	8	-.13		-.18		
Negative Mood							
CWB Overall ^l	8,914	40			.32	.16	.06, .58
CWB Overall ^x	2,981	8			.31		
Absenteeism ^y	471	3	-.02		-.02		-.18, .13
Organizational Cynicism							
CWB Overall ^{z,2}	731	4	.43		.48	.11	.30, .66
CWB Overall ^{z,6}	788	2	.78		.85	.21	.50, 1.00
Turnover Intentions ^z	1,234	4	.49		.55	.00	.55, .55
Turnover Intentions ^{aa}	1,392	5	.33		.39	.03	.34, .44

(Continued)

Table 6.4 Relations among attitudinal variables and CWB: Summary from meta-analyses (continued)

Measure	<i>N</i>	<i>k</i>	<i>r</i> _{obs}	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	90% CI
Psychological Contract Breach							
Turnover Intentions ^{ac}	6,268	22	.34		.42	.15	.17, .67
Turnover ^{ac}	730	5	.05		.06	.18	-.24, .36

Note. *N* = total sample size; *k* = number of effect sizes; *r*_{obs} = mean, sample size-weighted correlation; *SD_r* = standard deviation of *r*; *ρ* = meta-analytic correlation – see numerical superscripts for details on criterion measurement and corrections applied; *SD_ρ* = standard deviation of *ρ*; CI = credibility interval. Values for CI were computed when sources did not originally report them but provided *ρ* and *SD_ρ*. Data bars for *ρ* are scaled from .00 to 1.00 and reference absolute values; gray bars indicate negative and black bars indicate positive mean effects. Data sources: ^a Carpenter & Berry (2014); ^b Colquitt et al. (2013); ^c Dalal (2005); ^d Carr et al. (2003); ^e Mathieu & Zajac (1990); ^f Koslowsky et al. (1997); ^g Farrell & Stamm (1988); ^h Tett & Meyer (1993); ⁱ Steel & Ovalle (1984); ^j Taylor (2012); ^k Meyer et al. (2002); ^l Lee, Carswell, & Allen (2000); ^m Bowling & Hammond (2008); ⁿ Berry, Carpenter, & Barratt (2012); ^o Sulea et al. (2010); ^p Lau, Au, & Ho (2003); ^q Kish-Gephart, Harrison, & Treviño (2010); ^r Griffeth, Hom, & Haertner (2000); ^s Herscovis et al. (2007); ^t Carson et al. (1994); ^u Kinicki et al. (2002); ^v Williams, McDaniel, & Nguyen (2006); ^w Christian et al. (2009); ^x Chang (2015); ^y Darr & Johns (2008); ^z Thundiyil et al. (2015); ^{aa} Chia-buru et al. (2013); ^{ab} Kristof-Brown, Zimmerman, & Johnson (2005); ^{ac} Zhao et al. (2007); ^{ad} Scott & Taylor (1985). ¹ other-rated; ² self-rated; ³ corrected for indirect range restriction; ⁴ not corrected for unreliability; ⁵ Job Descriptive Index only; ⁶ not self-rated.

less time to absenteeism ($\rho = -.43$), and be less frequently absent ($\rho = -.17$). Relations with turnover are somewhat weaker ($\rho = -.12$). The meta-analytic relationship between job involvement and overall CWB is negligible ($\rho = -.09$). Considering the substantial effect between job involvement and absenteeism assessed via lost time measures, future research should examine the relationships between job involvement and other narrow CWB constructs, for which the predictor might yield substantial utility. Considering the importance of the emerging construct of cyberloafing, investigations into relationships between job involvement and technologically mediated time theft behaviors might be particularly insightful.

Another affective influence of concern to many employers is the level of employees' commitment. Organizational commitment has been examined in about a dozen meta-analyses. In general, relationships between organizational commitment and overall CWB are moderately to strongly negative (ρ s range from $-.24$ to $-.36$). Although turnover demonstrates effects of similar magnitude (average $\rho = -.33$), absenteeism relates more weakly to commitment ($\rho = -.15$). The dimension of affective organizational commitment demonstrates a similar pattern, with very strong ties to turnover intentions (from $-.51$ to $-.58$) and modest but meaningful relationships to turnover ($\rho = -.17$) and absenteeism (mean $\rho = -.15$). Relations for continuance commitment and normative commitment are weaker. Shifting targets from organizational to occupational commitment, we note a slightly larger relationship with turnover ($\rho = -.21$).

Considering the powerful influence of satisfaction, involvement, and commitment, the role of fit in employee CWB comes to the forefront. Unfortunately, we could not locate any meta-analytic research on overall CWB, and only a single source relating fit to one narrow CWB construct – withdrawal. Intention to quit is most strongly related to person–job fit ($\rho = -.46$) and is most weakly related to person–group fit ($\rho = -.22$), whereas turnover weakly relates to both person–organization fit and person–job fit (ρ s = $-.14$ and $-.08$, respectively). Similar to other patterns previously discussed, fit appears to influence turnover intentions at a substantially greater magnitude than actual turnover.

Affective variables that appear to predict overall CWB well include organizational cynicism (self-reported $\rho = .48$) and negative mood (mean $\rho = .32$). Turnover intentions are well predicted by organizational cynicism (mean $\rho = .47$) and psychological contract breach ($\rho = .42$). It is disheartening that not much systematic knowledge exists between specific forms of CWB and the plethora of affective variables listed in Table 6.5, apart from the withdrawal constructs discussed above. This is a gap in the scholarly literature that urgently needs to be filled.

Demographic Variables

Gender

Extensive evidence suggests that women may engage in slightly less CWB than men. However, across studies, estimates of this effect have been

Table 6.5 Relations among demographic variables and CWB: Summary from meta-analyses

Measure	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	90% <i>CI</i>
Age							
CWB Overall ^{a,1,4}	2,091	13	-.05		-.06	.00	-.06, -.06
CWB Overall ^b	4,465	8	-.18		-.21	.00	-.21, -.21
CWB Overall ^{c,2}	7,072	28			-.12	.08	-.25, .01
CWB Overall ^{c,1}	1,151	6			-.12	.08	-.25, .01
CWB-Organizational ^b	1,055	4	-.16		-.17	.00	-.17, -.17
CWB-Organizational ^d	5,928	12	-.09		-.10	.08	-.23, .03
CWB-Organizational ^e	1,823	7	-.13	.03			
CWB-Organizational ^{d,1}	3,014	2			-.08		
CWB-Organizational ^{d,2}	2,914	10			-.13		
CWB-Interpersonal ^d	6,249	14	-.05		-.06	.06	-.16, .04
CWB-Interpersonal ^{d,1}	3,282	4			-.01		
CWB-Interpersonal ^{d,2}	2,967	9			-.10		
CWB-Interpersonal ^b	828	3	-.13		-.15	.00	-.15, -.15
CWB-Interpersonal ^e	2,404	10	-.14	.02			
Theft ^f	9,175	3	-.21	.04	-.21	.04	-.28, -.14
Production Deviance ^f	9,175	3	-.33	.05	-.33	.06	-.43, -.23
Workplace Aggression ^{c,2}	3,641	15			-.08	.15	-.33, .17
Unethical Behavior ^g	5,034	17	-.10	.10	-.11		
Lateness ^f	391	3	-.20	.06	-.21	.07	-.33, -.09
Lateness ⁱ	1,713	7	-.15	.13	-.19		
Lateness ^{c,2}	1,657	7			-.12	.12	-.32, .08
Lateness ^{c,4,5}	1,763	7			-.28	.14	-.51, -.05
Absenteeism ^f	1,221	6	-.11	.16	-.11	.07	-.23, .01
Absenteeism (Frequency) ^h	6,737	27	-.14	.22	-.20	.31	-.71, .31
Absenteeism (Frequency) ⁱ	6,277	28	-.10	.19	-.14		
Absenteeism (Non-Sickness) ^{c,2}	3,024	6			-.01	.11	-.19, .17
Absenteeism (Non-Sickness) ^{c,3}	2,508	12			-.10	.20	-.43, .23
Absenteeism (Time Lost) ⁱ	5,274	27	-.04	.09	-.06		
Absenteeism (Time Lost) ^h	6,507	29	-.09	.07	-.11		
Turnover Intentions ^b	741	4	-.06		-.06	.11	-.24, .12

(Continued)

Table 6.5 Relations among demographic variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Turnover ⁱ	21,656	45	-.09		-.11		
Withdrawal ^b	2,212	6	-.07		-.08	.08	-.21, .05
Safety Non-Compliance ^c	612	5			-.10	.07	-.22, .02
Substance Abuse ^c	5,182	15			-.07	.08	-.20, .06
Composite ^f (Theft, Production Deviance, Absenteeism, Alcohol Abuse)	23,388	18	-.17		-.25	.10	-.41, -.09
Gender⁶							
CWB Overall ^{k,3}	378	3			.00	.00	.00, .00
CWB Overall ^{k,1}	466	4			-.04	.12	-.24, .16
CWB Overall ^{a,1}	2,080	13	.07		.08	.13	-.13, .29
CWB Overall ^{k,2}	5,020	25			-.11	.13	-.32, .10
CWB Overall ^{k,1}	580	4			-.19	.22	-.55, .17
CWB-Overall ^m	1,843	6	-.21		-.21		
CWB-Organizational ^m	3,363	11	-.11		-.13		
CWB-Organizational ^{k,1}	808	5			-.19	.01	-.21, -.17
CWB-Organizational ^d	5,929	12	-.11		-.12	.08	-.25, .01
CWB-Organizational ^{k,1}	2,786	12			-.03	.10	-.19, .13
CWB-Organizational ^{k,2}	10,966	40			-.10	.10	-.26, .06
CWB-Organizational ^e	2,031	7	-.09	.03			
CWB-Organizational ^{d,1}	3,014	2			-.13		
CWB-Organizational ^{d,2}	2,915	10			-.11		
CWB-Interpersonal ^m	3,653	14	-.19		-.21		
CWB-Interpersonal ^d	6,250	14	-.14		-.15	.06	-.25, -.05
CWB-Interpersonal ^{k,1}	2,078	9			-.16	.06	-.26, -.06
CWB-Interpersonal ^{k,2}	14,769	40			-.12	.09	-.27, .03
CWB-Interpersonal ^k	1,949	9			-.03	.11	-.21, .15
CWB-Interpersonal ^e	2,301	9	-.13	.03			
CWB-Interpersonal ^{d,2}	2,968	10			-.19		
CWB-Interpersonal ^{d,1}	3,282	4			-.12		
Unethical Behavior ^g	5,350	17	-.09	.11	-.10		
Absenteeism ^f	2,093	6	.09	.06	.10	.06	.00, .20

Table 6.5 Relations among demographic variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Absenteeism (Frequency) ⁱ	1,163	4	.06	.16	.08		
Absenteeism (Time Lost) ⁱ	2,419	6	-.07	.06	-.11		
Lateness ^f	215	2	.07	.16	.04	.16	-.22, .30
Lateness ^l	1,502	5	-.03	.08	-.04		
Turnover ^j	17,301	22	-.03		-.03		
Alcohol Abuse ^f	4,070	4	-.12	.04	-.10	.02	-.13, -.07
Tenure							
CWB Overall ^{a,1}	440	3			.11	.00	.11, .11
CWB Overall ^{a,3}	326	3			-.14	.00	-.14, -.14
CWB Overall ^{a,2}	5,357	19			-.05	.04	-.12, .02
CWB Overall ^{a,1,4}	1,552	10	-.06		-.06	.07	-.18, .06
CWB Overall ^{a,1}	1,478	4			-.19	.07	-.31, -.07
CWB Overall ^a	7,601	29			-.07	.08	-.20, .06
CWB Overall ^{n,2}	856	4			-.02	.09	-.17, .13
CWB Overall ^{n,2}	1,696	7			.07	.10	-.09, .23
CWB Overall ^e	676	4	-.11	.06			
CWB-Organizational ^{n,2}	1,198	3			.00	.00	.00, .00
CWB-Organizational ^d	2,710	9	-.07		-.08	.05	-.16, .00
CWB-Organizational ^{d,2}	2,453	8			-.07		
CWB-Organizational ^{d,1}	257	1			-.18		
CWB-Interpersonal ^d	2,211	7	-.01		-.01	.00	-.01, -.01
CWB-Interpersonal ^{n,2}	1,198	3			-.01	.00	-.01, -.01
Theft ^f	9,175	3	-.10	.04	-.12	.03	-.17, -.07
Absenteeism ^{n,3}	370	2			-.19	.02	-.22, -.16
Absenteeism ^{n,2}	6,309	6			-.02	.07	-.14, .10
Absenteeism ^{a,3}	72,011	50			-.17	.05	-.25, -.09
Absenteeism ^{a,2}	8,531	15			-.04	.07	-.16, .08
Absenteeism ^a	80,542	65			-.16	.07	-.28, -.04
Absenteeism ^f	1,807	4	-.05	.10	-.13	.12	-.33, .07
Absenteeism (Frequency) ⁱ	6,463	29	-.08	.15	-.11		

(Continued)

Table 6.5 Relations among demographic variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Absenteeism (Non-Sickness) ^{a,3}	56,708	14			-.18	.05	-.26, -.10
Absenteeism (Non-Sickness) ^{a,3} – w/o outl.	4,734	13			-.04	.10	-.20, .12
Absenteeism (Sickness) ^{n,2}	3,571	2			.00	.00	.00, .00
Absenteeism (Sickness) ^{a,2}	4,824	5			.09	.04	.02, .16
Absenteeism (Sickness) ^o	10,990	20			.03	.10	-.13, .19
Absenteeism (Sickness) ^{a,3}	6,166	15			-.02	.10	-.18, .14
Absenteeism (Sickness) ^{a,2} – w/o outl.	702	4			.01	.08	-.12, .14
Absenteeism (Time Lost) ⁱ	5,827	28	-.03	.11	-.05		
Lateness ^f	391	3	-.13	.02	-.13	.02	-.16, -.10
Lateness ⁱ	2,542	8	-.06	.08	-.08		
Lateness ^{a,2}	904	5			-.10	.10	-.26, .06
Lateness ^{a,3}	2,629	12			-.02	.13	-.23, .19
Lateness ^o	3,533	17			-.04	.13	-.25, .17
Turnover ⁱ	29,313	53	-.20		-.23		
Substance Abuse ^{a,2}	8,929	16			-.01	.04	-.08, .06
Accidents/Injuries ^{n,3}	939	2			-.04	.00	-.04, -.04
Accidents/Injuries ^{n,2}	4,542	5			.02	.06	-.08, .12
Safety Non-Compliance ^{n,2}	2,195	3			.01	.00	.01, .01
Education							
Unethical Behavior ^g	2,621	7	.00	.06	.00		
Absenteeism ^f	269	2	-.01	.01	-.01	.01	-.03, .01
Lateness ^f	259	2	-.02	.02	-.01	.02	-.04, .02
Turnover ⁱ	11,708	35	.05		.06		
Family-Related							
Kinship Responsibilities⁷							
Turnover ⁱ	8,220	11	-.08		-.01		
Children							
Turnover ⁱ	9,043	8	-.14		-.16		
Marital Status⁸							
Theft ^f	9,175	3	.11	.05	.11	.05	.03, .19
Absenteeism ^f	415	2	.02	.10	.02	.10	-.14, .18
Lateness ⁱ	1,675	5	-.06	.03	-.07		
Turnover ⁱ	16,684	28	-.05		-.05		

Table 6.5 Relations among demographic variables and CWB: Summary from meta-analyses (continued)

Measure	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	90% <i>CI</i>
Race⁹							
Absenteeism ^f	366	2	.07	.16	.07	.16	-.19, .33
Turnover ⁱ	10,683	7	.01		.02		
Misc.							
Work Experience							
CWB-Organizational ^d	783	3	-.22		-.25	.00	-.25, -.25
CWB-Interpersonal ^d	794	3	-.10		-.10	.00	-.10, -.10
Demographics Composite							
Lateness ^l	2,778	10	.08		.10		
Promotion Opportunities							
Turnover (Voluntary) ^p	4,629	5	-.09	.08	-.09	.01	-.11, -.07
Weighted Application Blank							
Turnover ⁱ	1,329	6	.31		.31		
Training							
Turnover ⁱ	3,815	6	-.07		-.08		
Participation							
Turnover ⁱ	4,825	10	-.10		-.13		

Note. *N* = total sample size; *k* = number of effect sizes; *r_{obs}* = mean, sample size-weighted correlation; *SD_r* = standard deviation of *r*; *ρ* = meta-analytic correlation – see numerical superscripts for details on criterion measurement and corrections applied; *SD_ρ* = standard deviation of *ρ*; *CI* = credibility interval. Values for *CI* were computed when sources did not originally report them but provided *ρ* and *SD_ρ*. Data bars for *ρ* are scaled from .00 to 1.00 and reference absolute values; gray bars indicate negative and black bars indicate positive mean effects. Data sources: ^a Berry, Carpenter, & Barratt (2012); ^b Carpenter & Berry (2014); ^c Ng & Feldman (2008); ^d Berry, Ones, & Sackett (2007); ^e Sulea et al. (2010); ^f Lau, Au, & Ho (2003); ^g Kish-Gephart, Harrison, & Treviño (2010); ^h Martocchio (1989); ⁱ Farrell & Stamm (1988); ^j Griffeth, Hom, & Gaertner (2000); ^k Ng, Lam, & Feldman (2016); ^l Koslowsky et al. (1997); ^m Herscovis et al. (2007); ⁿ Ng & Feldman (2013); ^o Ng & Feldman (2010); ^p Carson et al. (1994). ¹ other-rated; ² self-rated; ³ external report; ⁴ corrected for indirect range restriction; ⁵ corrected for interrater reliability; ⁶ male = 0, female = 1; ⁷ not-employed spouse = 0, employed spouse = 1; ⁸ single = 0, married = 1; ⁹ non-white = 0, white = 1.

substantially influenced by measurement source. The most recent meta-analysis demonstrated unreliability-corrected *d* values for overall CWB were 0.22, 0.39, 0.08, and 0.00 based on self-reports, supervisor ratings, peer ratings, and archival records, respectively (Ng, Lam, & Feldman, 2016). Similar disparity occurred at the dimension level. Men engaged in more CWB-I than women; *d* = 0.24 according to self-reports, and *d* = 0.06 and 0.32 for supervisor and peer ratings, respectively. For CWB-O, differences were 0.10, 0.03, and 0.19 standard deviation units for self-, supervisor-, and peer-ratings, respectively. These estimates correspond with previous meta-analytic estimates for

overall effects on CWB-I and CWB-O (*ps* = .30 and .24, respectively; Berry et al., 2007).

Given these small direct effects on CWB, several researchers have considered how gender and other known correlates of counterproductivity might interact. For example, Spector and Zhou (2014) demonstrated the moderating role of gender on two well-established types of antecedents of CWB: stressors and individual differences. The positive relationship between organizational constraints and CWB was stronger for men than for women, and similar moderation was observed for the interpersonal conflict-relational aggression link. Gender also proved instrumental in the relationship

between personality and CWB. The effects of both agreeableness and trait anger on CWB were moderated by gender, with personality serving as a stronger influence on men than women. Similar effects were observed for the influences of conscientiousness and emotional stability on CWB-I.

Scholars have posited that the moderating role of gender stems from different motivations that men and women might have to engage in counterproductivity. For example, a recent study suggested that men engage in interpersonal counterproductivity to assert themselves and dominate over others, whereas women engage in CWB-I due to a lack of inhibition (Gonzalez-Mulé, DeGeest, Kiersch, & Mount, 2013). Supporting their expectations, agreeableness negatively related to CWB-I among men but not women and emotional stability negatively related to CWB-I among women but not men. Investigating the corresponding circumplex personality traits of calmness and pleasantness, their results demonstrated a similar moderation effect for pleasantness, the trait driven primarily by agreeableness, such that pleasantness predicted CWB-I only for men. As the CWB literature examining the influences of both stressors and individual differences grows, these nuanced studies represent the myriad of opportunities to investigate simple demographic characteristics as potential boundary conditions for these important relationships.

In addition to examining the moderating role of gender (i.e., how gender influences predictor–CWB relationships), there also remain many unanswered questions in terms of explaining why gender differences in magnitude of counterproductive behaviors occur (i.e., what conditions moderate the main effect of gender on CWB). An insightful meta-analysis of aggression studies demonstrated that the magnitude of gender differences in aggression was quadratically related to the emotional arousal of the context in which it was assessed (Knight, Guthrie, Page, & Fabes, 2002). Across studies, greater gender differences occurred in contexts that produced smaller increments of emotional arousal.

Because scholarly work addressing CWB has traditionally proven influential to HR practice (e.g., selection, assessment, and performance management interventions), the importance of investigating the effects of demographic variables cannot be overstated. Empirical investigations of a variety of predictors and criterion measures have explored the magnitude of gender differences as well as the potential for adverse impact associated with various assessments. Moving forward, studies focused on how gender interacts with influential predictors and how it influences the outcomes of various performance management practices will be particularly useful.

Gender and CWB constructs:

A review of meta-analytic findings

Across meta-analytic investigations, a consistent pattern emerges of small gender differences in CWB with men typically engaging in more counterproductivity than women (see Table 6.5). For overall CWB, the effect of gender is weak ($\rho = .08$). However, this effect is stronger at the dimension level; organizational and interpersonal CWB similarly relate to gender (ps approximate .12 and .14, respectively). Conversely, women tend to have higher rates of absenteeism than men (overall absenteeism $\rho = .10$; frequency of absences $\rho = .08$). Gender differences for specific forms of CWB such as production deviance, sexual harassment, violence, and undermining, merit future examination.

Age

In the US, the Age Discrimination in Employment Act (ADEA; 1967) protects individuals 40 years of age or older from age-based discrimination. Similar laws exist throughout the European Community, even if they include less clear-cut definitions of ‘older workers’. Given demographic developments in most industrialized nations, the majority of workers today can be expected to benefit from such protection. The median age of American employees (42.2 years; Bureau of Labor Statistics, 2016) now exceeds the 40-year threshold, and most European economies are subject to similar trends (European Commission DG ECFIN & AWG, 2012). As workforces continue to grow older, age effects increase in relevance for most organizations. Older workers may be advantageous to organizations due to their greater work and life experience; however, in some respects they are substantially more costly than younger workers. Their higher seniority frequently corresponds with greater pay, and their benefits packages and health insurance costs command premium prices. A potentially lower occurrence of CWB among an older worker population might alleviate some concerns.

The rich literature examining age within the discipline of criminology greatly informs our discussion of age effects within the work context. Trends in crime rates, as evidenced from the US Federal Bureau of Investigations and Bureau of Justice Statistics, have shown a remarkably constant decrease in crime rates since the early 1990s across various types of crimes (e.g., O’Brien, 2003). It is known that age is negatively related to criminal behaviors to the extent that younger individuals exhibit more criminal acts than older ones. The relationship is a non-linear one where

a sharp increase in criminal/antisocial behavior occurs in late adolescence, followed by a sharp decline in early adulthood, with a steady decrease in life afterward. Explanations for this phenomenon abound but promising developmental work posits two likely causes: personality development and neurobiological development. The dual systems model (Shulman et al., 2016) demonstrates pubescent teenagers develop a sensitivity for excitement, pleasure, and novel experiences much sooner than development of an inhibitory system which would lead to impulse restraint. As the brain develops with age, the countervailing mechanism of self-control catches up to the exploration system. Blonigen (2010) suggests that the developmental trajectory of antisocial behavior parallels the developmental trajectory of various personality traits.

Within work psychology, Ng & Feldman (2008) meta-analytically examined the extent to which age influenced several components of job performance. Age negligibly related to core task performance and creativity, and only modestly related to CWB and citizenship behaviors. Interestingly, although the effect on general CWB was small ($\rho = -.12$), their findings demonstrated moderate relationships between age and externally detected tardiness ($\rho = -.28$) and objectively measured absenteeism ($\rho = -.26$). While the image of an 'older worker' may create concerns of increased illness-related absence and other negative performance associations, age corresponded with better attendance among workers.

An extraordinarily large-scale primary study investigated another potential benefit of an older workforce; Avery, McKay, and Hunter (2012) examined the effects of age on retail shrinkage in a sample of 83,051 retail employees in 726 stores. Their findings demonstrate that not only does age negatively relate to retail shrinkage, but also the proportion of older employees in the workforce influences merchandise loss. Stores with more older workers and a climate supportive of whistle-blowing – the suggested mechanism for older workers' positive influence – experienced even less shrinkage. In fact, in their sample a one-year increase in average employee age corresponded to \$14,000 less loss per store, for a total of \$10,000,000 savings across the entire sample. Taken together, these large-scale primary results and the meta-analytic estimates of the effects of age suggest that older employees may be beneficial to organizations when it comes to CWB; although these employees do not exhibit demonstrably greater task performance or citizenship, they cause substantially less harm to their employers through counterproductive behaviors.

Age and CWB constructs:

Review of meta-analytic findings

Age is negatively related to counterproductive work behaviors. Older individuals tend to engage in less CWB (ρ s with overall CWB average around $-.13$). Both organizational and interpersonal CWB follow the same negative pattern of relationships. No research in IWO psychology has examined the linearity or the relative differences in strength of the relationship (or the rate of decline) at different developmental points in time.

Tenure and education

As time spent with an organization increases, employees experience greater benefits from their employer (e.g., salary and status) and may in turn contribute more meaningfully to the organization. Human capital theory suggests that longer tenure would accompany greater knowledge accumulation. Similarly, the attraction-selection-attrition model (ASA) suggests that only satisfactory performers would be retained over the long term. Job embeddedness would also suggest that as employees' organizational tenure increases and their external mobility decreases, they might align their interests more closely with organizational values and demonstrate better job performance. In light of the many theoretical frameworks supporting the value of employees with greater organizational tenure, meta-analytic efforts have sought to estimate the effects of organizational tenure on performance. Across 350 studies and nearly 249,841 employees, organizational tenure demonstrated small positive relationships with in-role performance and citizenship as well as modest negative relationships with most forms of counterproductivity, with the exception of a small positive effect on workplace aggression (Ng & Feldman, 2010). Tenure was also negatively related to injuries and unsafe behaviors. Controlling for age, organizational tenure slightly positively related to counterproductive behaviors. Regarding the effects of tenure on job performance, the results demonstrated a curvilinear relationship, such that the strength of positive association decreases as organizational tenure increases. This meta-analysis, while providing guidance on the main effects of tenure on performance, also left several questions regarding organizational tenure unanswered.

In their subsequent meta-analysis, Ng & Feldman (2013) explored both the positive and negative components of increased tenure in relation to job performance. While they recognized that both human capital theory and ASA suggested a positive link between job tenure and performance, they also explored an additional, previously overlooked phenomenon. The authors argued that

motivation would decrease as employees remained within the same position and became bored with their tasks. They questioned whether the negative outcomes of this boredom – decreased job satisfaction and decreased motivation – would counteract the potential benefits of more experienced, competent employees. Results demonstrated a negligible relationship between job tenure and core task performance and overall CWB. However, job tenure was modestly positively related to self-reported non-sickness absence ($p = .17$). These findings, yet again, suggest that employees with greater tenure may not be substantially greater contributors to their employers than more junior employees. Due to the costs of retaining senior employees, more nuanced investigations into the benefits of retention (e.g., accounting for performance differences in addition to replacement costs) are necessary to better devise advantageous workforce planning strategies.

At the meta-analytic level, typically, relationships with tenure mimic relationships with age. However, for the tenure-overall CWB relationship, we see a reduction compared to the age-overall CWB link (ps around .04). Both the organizational and interpersonal dimensions of CWB exhibit relationships with tenure that are negligible in magnitude. Notably, counterproductive behaviors that are also criminal, such as theft, may correlate somewhat more strongly with tenure ($p = -.12$). Turnover moderately negatively correlated with tenure ($p = -.23$). Overall, as individuals gain work experience, they generally exhibit less CWB ($ps = -.10$ and $-.25$ for interpersonal and organizational CWB, respectively).

Yet another form of human capital that is highly valued among employees is education. The effects of education levels on a variety of employee outcomes have been investigated at length, but commonly as control variables. Nonetheless, this has facilitated large-scale meta-analyses on the relationship between education and many forms of job performance, including core task performance, citizenship, CWB, workplace aggression, on-the-job substance abuse, and absenteeism, among others. According to meta-analytic results, education generally exerts a modest positive influence on performance, including not only gains in its positive components but also decreases in counterproductive behaviors (Ng & Feldman, 2009). Although education level was largely unrelated to overall counterproductivity ($p = .01$ for self-reported behaviors), it was slightly negatively related to workplace aggression ($p = -.09$) and moderately negatively related to on-the-job substance abuse ($p = -.28$) and objectively measured absenteeism ($p = -.22$). Given these results, as well as the fact that there are more potent and fair individual differences-based predictors of

task performance and CWB (across domains), it does not seem prudent to rely on education level (alone or primarily) in designing recruitment and selection interventions to maximize performance. Similarly, other demographic variables investigated, such as marital status, having children, and kinship responsibilities, as well as race/ethnicity majority-minority status, have negligible to weak relationships with withdrawal constructs. Of course, the systematic use of such information in most HR interventions is precluded by ethical and legal considerations. However, an examination of the mostly null-effects summarized in Table 6.5 is both informative and encouraging.

Cultural values

The scholarly literature examining counterproductivity has largely transitioned to an interactionist perspective, extending investigations beyond the main effects of individual differences and situations to how these factors might interact to influence CWB. A particularly interesting stream of such studies examines the effects of cultural values, specifically cultural values as individual differences variables. In a primary study of employees in Thailand, Smithikrai (2014) demonstrated how personal cultural values can influence individuals' perceptions of their work environments, thereby influencing their levels of counterproductivity. Vertical individualism, the tendency for individuals to seek status and position through competition, positively related to CWB, while horizontal collectivism, the tendency for individuals to seek commonality and similarity with a group, negatively related to CWB. These relationships were partially mediated by perceptions of job stress. The author posited that collectivism led individuals to seek social support to alleviate the strain of stressors, while individualism led employees to perceive stressors as threats.

In a related investigation of the role of personal cultural values on CWB, Guo (2012) examined Confucian values in a sample of Chinese employees. Confucian values consist of introspection, self-discipline, selflessness, conformity, impulse management, and the pursuit of harmony. Therefore, Confucian values might lead individuals to respond differently to common triggers of CWB. Rather than experiencing negative emotions toward others or the organization, individuals higher on Confucian values might turn to introspection in the face of stressors. Guo found that Confucian values negatively influenced production deviance. The link between Confucian values and two forms of production deviance, slackness and withdrawal, were partially mediated by job satisfaction.

Together, these studies on the influence of cultural values on CWB highlight several important opportunities for future research. First, although scholars have long recognized the variance within nations on cultural values (e.g., Triandis, 1995), cultural values are still often treated as national characteristics in many investigations by organizational psychologists. As exemplified by these studies, this ecological fallacy can obscure influential individual differences. Second, research in CWB has traditionally been culturally constrained. Not only have cultural values not been heavily examined, but studies have been focused in Western contexts, using constructs and measures infrequently validated cross-culturally. As this body of literature continues to mature, more inclusive study designs are needed to recognize not only distinct correlates across countries but also potentially different manifestations of counterproductivity.

Organizational Factors and Interventions

Electronic monitoring

Technology has altered not only how employees engage in productivity but also how supervisors monitor performance. While heavy reliance on technology can add new challenges for supervisors (e.g., monitoring telecommuters), technologically mediated work also provides new surveillance opportunities. Electronic performance monitoring (EPM; also termed electronic surveillance or monitoring) refers to systems that store records of actions performed on electronic devices (e.g., work computers) and allow for later analysis (Davidson & Henderson, 2000). Electronic monitoring can take many forms, including call monitoring as well as synchronous or asynchronous surveillance of computerized tasks. The vast majority of employers monitor Internet connections, while a large proportion of organizations monitor email and collect detailed data about computer use (e.g., keystrokes; American Management Association, and The ePolicy Institute, 2007). Employers use monitoring as a formal sanction to enhance employees' concerns over their behaviors being detected and punished (D'Arcy & Devaraj, 2012).

Empirical support for the effectiveness of this form of supervision has been limited. Meta-analytic results suggest that broadly operationalized electronic monitoring – from the early days of call monitoring to more modern forms – is positively related to work performance (Carroll, 2008). However, scholars have also expressed concerns

over both the ethicality of invading employee privacy (e.g., Halpern, Reville, & Grunewald, 2008; Persson & Hansson, 2003) as well as the potential consequences, such as negative employee attitudes toward surveillance and subsequent undesirable behaviors. Recently, Martin, Wellen, and Grimmer (2016) examined the effects of electronic surveillance on counterproductivity in a sample of 406 Australian employees. Employees who perceived higher levels of electronic surveillance engaged in more CWB; this relationship was mediated by unfavorable attitudes toward surveillance. However, interestingly, this relationship did not occur among employees who reported high work empowerment. Another empirical investigation has demonstrated the opposite. In two field studies, Bhawe (2014) demonstrated that more frequent use of electronic monitoring was positively related to desirable components of performance and unrelated to counterproductivity. He suggested that monitoring may serve as an electronic presence driving employees to perform better and earn greater performance evaluations.

Although only limited empirical investigation has addressed the influence of monitoring on CWB, these results suggest that electronic monitoring must be carefully implemented in organizations. Just as increased monitoring may yield enhanced performance, it may also result in retaliation or other undesirable phenomena, especially if employees express concerns about an invasion of privacy. In addition, several countries, including all EU member states, have strict data protection regulations that govern the collection of personal data in the workplace (e.g., EU Directive 95/46/EC), that would either prohibit collection of or require careful separation of even basic personal identifying information during the course of such monitoring (see Article 29 Data Protection Working Party, 2002; Freedland, 1999). Rather than hastily implementing electronic monitoring as a simple solution, employers must assess the potential performance outcomes among their distinct employee populations to justify the perceived invasion of employee privacy, legal risks to be managed, and financial costs associated with monitoring.

Feedback

Drawing upon eighteenth- and nineteenth-century ideas laid forth by Jeremy Bentham, John Stuart Mill, and Henry Sidgwick, Bunnin and Tsui-James (2003) posit that people are responsive to pain and pleasure which stem from four sanctioning bodies. Social sanctions refer to societal norms that regulate the actions of those within the social structure (Sidgwick, 1874). Deviations

from social norms elicits a form of pain – pain may be an internal conflict or an external punishment – that dissuades individuals from continuing antisocial behaviors. This idea of illuminating counternormative behavior has recently resurged in psychology in the form of feedback provided to reduce the prevalence of CWB (Ilies, Peng, Savani, & Dimotakis, 2013). Quasi-experimentally manipulating feedback (feedback versus no feedback) in a group of employees found that for individuals with higher levels of CWB, receiving feedback induced feelings of guilt and increased prosocial intentions and actual levels of OCB. Despite the small sample size and only modest improvement, the Ilies et al. study supports the notion that telling people they are violating social norms positively impacts their voluntary behaviors. However, their time-delayed measure of actual OCB was collected just three days after the feedback was provided and no follow-up examining CWB was conducted. Feedback may only temporarily increase OCB, and deviants might regress back to their respective mean.

Outside of IWO psychology, researchers have corroborated the claim that attending to norms has demonstrable impact on human behavior (Cialdini, Reno, & Kallgren, 1990). For instance, telling a homeowner their energy consumption is significantly greater than that of their neighbors was enough to prompt a decrease in subsequent energy consumption. Further still, the *type of norm* being attended to may shape the ensuing behavior. Prescriptive/injunctive norms (what people approve of) versus descriptive norms (what people actually do) have been shown to produce different attitudinal shifts. Regarding collegiate drinking behavior, descriptive norm-based interventions successfully changed attitudes toward drinking after four weeks but interventions based on prescriptive norms were less clearly effective (Borsari & Carey, 2003). Future research should examine which types of norms within an organization provoke the strongest suppression of CWB and for the longest duration. Are people more likely to subdue their tendency for CWB if their work group norms or organization-wide norms are the referent? Do individual differences moderate the relationship such that disagreeable and emotionally volatile employees do not internalize self-other discrepancies? Providing feedback on employee deviant behaviors has received remarkably little attention but has potential utility in reducing the prevalence and frequency of undesirable behaviors.

Organizational justice

Organizational justice is among the most heavily investigated predictors of counterproductivity. This

attention has allowed for many meta-analytic investigations into the relationship between employee perceptions of various forms of (in)justice and CWB (C. S. Chang, 2015; Cochran, 2014; Cohen-Charash & Spector, 2001; Colquitt, Conlon, Wesson, Porter, & Ng, 2001; Colquitt et al., 2013). Despite some differences due to study inclusion, these results converge to demonstrate the substantial validity of organizational justice in the prediction of employee counterproductivity. Counterproductivity relates moderately negatively to distributive, informational, interpersonal, and procedural justice (Cochran, 2014). A detailed overview of meta-analytic estimates of the justice–CWB relationship is provided in Table 6.6.

With the influence of justice on CWB well established, scholars have focused their efforts on examining how this relationship occurs. A recent study explored this phenomenon in the context of employees' responses to a performance appraisal (Jacobs, Belschak, & Den Hartog, 2014). First, the results demonstrated that justice perceptions pertaining to that specific event did influence CWB, including both production deviance and complaining behaviors. More importantly, several mediators were identified. Outcome justice influenced CWB via decreased negative affect, whereas the procedural justice–CWB relationship was mediated by supervisor- and organizational support. Interpersonal justice influenced CWB through both decreased negative affect and increased perceptions of support. These results have implications for several growing domains of inquiry, including the affective component of employee counterproductivity as well as a job demands–resources approach to understanding CWB.

Affective variables have been the target of mounting interest by CWB scholars (e.g., Spector & Fox, 2002). One such study extended investigations into the influence of discrete emotions on the injustice–CWB relationship to the Pakistani work context (Khan, Quratulain, & Crawshaw, 2013). This context is particularly noteworthy due to high power distance that characterizes work culture in Pakistan, which might influence employees to tolerate injustice out of deference to authority, as well as cultural appreciation of harmony. Even in this potentially constrained context, distributive injustice led to anger, which influenced both production deviance and abuse against others. In addition to cultural influences that might reduce retaliatory behaviors in Pakistan, economic conditions such as high unemployment and low job security also suggest that employees might be more tolerant of mistreatment at work. However, this mediating effect of a discrete emotion powerfully demonstrates that employees' reactive counterproductivity need not be rational or instrumental; rather,

Table 6.6 Relations among justice variables and CWB: Summary from meta-analyses

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Organizational Justice							
CWB Overall ^{c,2}	1,295				-.14		
CWB Overall ^{c,1}	14,557				-.17		
CWB Overall ^m	2,130	11	-.18		-.25		
Distributive Justice							
CWB Overall ^{f,2,3}	820	5	-.07		-.07	.21	-.42, .28
CWB Overall ^k					-.14		
CWB Overall ^b	1,683	4	-.10		-.12	.06	-.22, -.02
CWB Overall ^c	5,719	22	-.13		-.15	.06	-.25, -.05
CWB Overall ^{c,2}	575				-.07		
CWB Overall ^{c,1}	5,719				-.13		
CWB Overall ^g	10,679	32	-.14		-.17	.21	-.52, .19
CWB Overall ⁱ	597	3	-.22	.17			
CWB Overall ^e	5,112	24	-.22		-.26	.10	-.42, -.10
CWB Overall ^j	327	2	-.31		-.35		
CWB Overall ^d	25,002	68			-.15	.16	-.41, .11
CWB-Organizational ^k	1,089	5	-.10		-.12	.00	-.12, -.12
CWB-Organizational ^{k,2}	257	1			-.07		
CWB-Organizational ^{k,1}	832	4			-.13		
CWB-Organizational ^c	2,827	10	-.08		-.09	.08	-.22, .04
CWB-Organizational ^g	3,969	13	-.10		-.11	.13	-.32, .10
CWB-Organizational ^e	2,931	11	-.20		-.23	.11	-.41, -.05
CWB-Organizational ^j	3,257	11	-.12		-.15		
CWB-Organizational ^a	1,660	6	-.18		-.25	.00	-.25, -.25
CWB-Organizational ^b	1,660	6	-.18	.02			
CWB-Interpersonal ^k	1,089	5	-.12		-.13	.00	-.13, -.13
CWB-Interpersonal ^{k,1}	832	4			-.12		
CWB-Interpersonal ^{k,2}	257	1			-.18		
CWB-Interpersonal ^c	2,963	11	-.06		-.07	.05	-.15, .01
CWB-Interpersonal ^g	5,007	17	-.11		-.13	.13	-.33, .08

(Continued)

Table 6.6 Relations among justice variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
CWB-Interpersonal ^e	788	5	-.11	-.15		.14	-.38, .08
CWB-Interpersonal ^a	1,763	7	-.15	-.20		.00	-.20, -.20
CWB-Interpersonal ^h	1,763	7	-.15	.02			
Supervisor-Directed Aggression ^e	784	4	-.08	-.10		.42	-.79, .59
Supervisor-Directed Aggression ^j	1,264	4	-.14	-.17			
Coworker-Directed Aggression ⁱ	2,757	11	-.12	-.13			
Abuse ^g	146	1	-.09	-.11			
Production Deviance ^g	558	2	-.32	-.35		.39	-.99, .29
Sabotage ^g	3,566	10	-.14	-.18		.20	-.50, .15
Theft ^g	457	2	-.21	-.24		.25	-.65, .16
Turnover Intention ⁱ	14,572	8	-.40	.11			
Turnover ⁱ	4,871	11	-.08	-.11			
Withdrawal ^g	3,274	9	-.09	-.11		.15	-.36, .13
Withdrawal ^b	1,683	4	.07	.08		.31	-.43, .59
Distributive Justice – Entity-Based							
CWB Overall ^e	3,329	16	-.20	-.24		.12	-.44, -.04
CWB-Organizational ^e	1,764	6	-.16	-.19		.09	-.34, -.04
CWB-Interpersonal ^e	659	4	-.10	-.14		.16	-.40, .12
Supervisor-Directed Aggression ^e	556	2	-.17	-.20		.10	-.36, -.04
Distributive Justice – Event-Based							
CWB Overall ^e	3,100	9	-.08	-.08		.21	-.43, .27
CWB-Organizational ^e	2,779	6	-.06	-.06		.21	-.41, .29
CWB-Interpersonal ^e	129	1	-.19	-.21			
Supervisor-Directed Aggression ^e	228	2	-.12	-.16		.70	-1.00, .99
Distributive Justice – Organization-Focused							
CWB Overall ^e	3,585	17	-.22	-.27		.05	-.35, -.19
CWB-Organizational ^e	2,337	9	-.18	-.21		.09	-.36, -.06
CWB-Interpersonal ^e	788	5	-.11	-.15		.14	-.38, .08
Supervisor-Directed Aggression ^e	556	2	-.17	-.20		.10	-.36, -.04
Distributive Justice – Supervisor-Focused							
CWB Overall ^e	160	1	-.49	-.58			

Table 6.6 Relations among justice variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
CWB-Organizational ^e	702	4	-.19		-.22	.21	-.57, .13
Supervisor-Directed Aggression ^e	228	2	-.12		-.16	.70	-1.00, .99
Procedural Justice							
CWB Overall ^a	1,289	5	-.30		-.39	.05	-.46, -.31
CWB Overall ^b	2,238	5	-.15		-.18	.09	-.33, -.03
CWB Overall ^c	6,328	24	-.14		-.17	.11	-.35, .01
CWB Overall ^d	23,562	72			-.19	.14	-.42, .04
CWB Overall ^e	6,455	30	-.23		-.28	.15	-.53, -.03
CWB Overall ^{f2,3}	1,659	10	-.20		-.22	.18	-.52, .08
CWB Overall ^g	9,823	29	-.20		-.23	.25	-.64, .18
CWB Overall ^h	1,494	6	-.28	.05			
CWB Overall ⁱ	597	3	-.28	.21			
CWB Overall ^j	564	3	-.32		-.40		
CWB Overall ^{c.1}	6,328				-.17		
CWB Overall ^{c.2}	574				-.19		
CWB Overall ^k					-.23		
CWB-Organizational ^a	2,012	7	-.26		-.36	.00	-.36, -.36
CWB-Organizational ^c	3,486	11	-.16		-.19	.02	-.22, -.16
CWB-Organizational ^k	1,542	7	-.18		-.21	.07	-.33, -.09
CWB-Organizational ^e	4,656	17	-.23		-.28	.08	-.41, -.15
CWB-Organizational ^g	5,217	16	-.21		-.25	.25	-.66, .17
CWB-Organizational ^l	3,257	11	-.18		-.21		
CWB-Organizational ^h	1,660	6	-.24	.04			
CWB-Organizational ^{k.2}	257	1			-.02		
CWB-Organizational ^{k.1}	1,285	6			-.25		
CWB-Interpersonal ^k	1,542	7	-.19		-.21	.02	-.24, -.18
CWB-Interpersonal ^{k.2}	257	1			-.10		
CWB-Interpersonal ^{k.1}	1,285	6			-.23		
CWB-Interpersonal ^c	3,486	11	-.16		-.19	.00	-.19, -.19
CWB-Interpersonal ^g	6,547	21	-.18		-.22	.22	-.58, .15

(Continued)

Table 6.6 Relations among justice variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	ρ	<i>SD_{ρ}</i>	90% <i>CI</i>
CWB-Interpersonal ^e	1,703	6	-.16	-.20		.09	-.35, -.05
CWB-Interpersonal ^a	2,012	7	-.23	-.31		.04	-.37, -.24
CWB-Interpersonal ^h	1,660	6	-.21	.04			
Supervisor-Directed Aggression ^e	1,232	7	-.23	-.31		.06	-.41, -.21
Supervisor-Directed Aggression ⁱ	1,264	4	-.23	-.29			
Coworker-Directed Aggression ⁱ	2,817	12	-.18	-.20			
Abuse ^g	504	2	-.16	-.20		.18	-.50, .11
Production Deviance ^g	677	3	-.22	-.26		.24	-.65, .14
Sabotage ^g	1,295	5	-.24	-.32		.32	-.84, .20
Theft ^g	167	1	-.54	-.57			
Turnover Intention ⁱ	17,687	18	-.40	.16			
Withdrawal ^g	1,295	5	-.16	-.19		.24	-.59, .21
Withdrawal ^b	2,298	5	-.03	-.03		.35	-.61, .55
Procedural Justice – Entity-Based							
CWB Overall ^e	4,212	17	-.21	-.26		.12	-.46, -.06
CWB-Organizational ^e	2,432	7	-.20	-.24		.04	-.31, -.17
CWB-Interpersonal ^e	1,457	4	-.15	-.19		.00	-.19, -.19
Supervisor-Directed Aggression ^e	671	3	-.20	-.25		.00	-.25, -.25
Procedural Justice – Event-Based							
CWB Overall ^e	2,243	13	-.25	-.31		.18	-.61, -.01
CWB-Organizational ^e	3,631	10	-.15	-.18		.17	-.46, .10
CWB-Interpersonal ^e	246	2	-.23	-.26		.28	-.72, .20
Supervisor-Directed Aggression ^e	561	4	-.25	-.39		.03	-.44, -.34
Procedural Justice – Organization-Focused							
CWB Overall ^e	3,488	18	-.26	-.32		.11	-.50, -.14
CWB-Organizational ^e	2,750	12	-.24	-.29		.04	-.36, -.22
CWB-Interpersonal ^e	484	3	-.13	-.16		.06	-.26, -.06
Supervisor-Directed Aggression ^e	553	2	-.19	-.24		.00	-.24, -.24
Procedural Justice – Supervisor-Focused							
CWB Overall ^e	2,816	11	-.19	-.23		.17	-.51, .05
CWB-Organizational ^e	1,906	5	-.22	-.26		.11	-.44, -.08

Table 6.6 Relations among justice variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
CWB-Interpersonal ^e	1,219	3	-.17	-.10		.10	-.26, .06
Supervisor-Directed Aggression ^e	679	5	-.25	-.37		.00	-.37, -.37
Informational Justice							
CWB Overall ^e	1,974	9	-.23	-.29		.09	-.44, -.14
CWB Overall ^g	1,926	7	-.21	-.25		.26	-.68, .17
CWB-Organizational ^e	1,226	5	-.18	-.22		.06	-.32, -.12
CWB-Organizational ^g	765	2	-.16	-.19		.18	-.49, .11
CWB-Interpersonal ^e	531	2	-.18	-.29		.04	-.36, -.22
CWB-Interpersonal ^g	911	3	-.25	-.31		.32	-.83, .22
Supervisor-Directed Aggression ^e	526	2	-.25	-.31		.29	-.79, .17
Abuse ^g	146	1	-.18	-.19		.19	-.50, .11
Production Deviance ^g	454	2	-.18	-.19		.24	-.61, .17
Sabotage ^g	1,927	7	-.19	-.22		.37	-.86, .34
Theft ^g	526	3	-.23	-.26		.16	-.43, .09
Withdrawal ^g	1,635	6	-.14	-.17		.16	-.43, .09
Informational Justice – Event-Based							
CWB Overall ^e	533	4	-.24	-.29		.09	-.44, -.14
CWB-Organizational ^e	444	3	-.23	-.28		.10	-.44, -.12
CWB-Interpersonal ^e	531	2	-.18	-.29		.04	-.36, -.22
Supervisor-Directed Aggression ^e	102	1	.23	.30		.04	-.36, -.22
Informational Justice – Entity-Based							
CWB Overall ^e	1,441	5	-.23	-.29		.10	-.45, -.13
CWB-Organizational ^e	782	2	-.16	-.19		.00	-.19, -.19
Supervisor-Directed Aggression ^e	424	1	-.37	-.45		.04	-.36, -.22
Information Justice – Organization-Focused							
CWB Overall ^e	444	3	-.23	-.28		.10	-.44, -.12
CWB-Organizational ^e	444	3	-.23	-.28		.10	-.44, -.12
Information Justice – Supervisor-Focused							
CWB Overall ^e	1,530	6	-.24	-.30		.09	-.45, -.15
CWB-Organizational ^e	782	2	-.16	-.19		.00	-.19, -.19
CWB-Interpersonal ^e	531	2	-.18	-.29		.04	-.36, -.22

(Continued)

Table 6.6 Relations among justice variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Supervisor-Directed Aggression ^e	526	2	-.25		-.31	.29	-.79, .17
Interactional Justice							
CWB Overall ^{c,4}	2,755	13	-.18		-.10	.08	-.23, .03
CWB Overall ^a	776	6	-.30		-.39	.14	-.62, -.16
CWB Overall ^d	17,780	64			-.23	.17	-.51, .05
CWB Overall ^{f,2,3}	505	3	-.40		-.45	.22	-.81, -.09
CWB Overall ^k					-.26		
CWB-Organizational ^k	1,190	6	-.18		-.21	.07	-.33, -.09
CWB-Organizational ^c	1,092	4	-.16		-.18	.00	-.18, -.18
CWB-Organizational ^{k,2}	257	1			-.05		
CWB-Organizational ^{k,1}	933	5			-.25		
CWB-Interpersonal ^c	1,092	4	-.24		-.28	.00	-.28, -.28
CWB-Interpersonal ^k	1,208	6	-.22		-.25	.13	-.46, -.04
CWB-Interpersonal ^{k,2}	257	1			-.10		
CWB-Interpersonal ^{k,1}	951	5			-.29		
Turnover Intention ⁱ	1,067	4	-.24	.15			
Interpersonal Justice							
CWB Overall ^k					-.14		
CWB Overall ^b	1,146	3	-.29		-.35	.03	-.40, -.30
CWB Overall ^g	2,804	12	-.27		-.30	.33	-.85, .24
CWB Overall ^e	2,043	10	-.20		-.24	.10	-.40, -.08
CWB Overall ^j	724	4	-.33		-.39		
CWB Overall ^h	776	6	-.27				
CWB-Organizational ^e	1,717	6	-.16		-.19	.00	-.19, -.19
CWB-Organizational ^k	1,242	4	-.06		-.07	.04	-.14, .00
CWB-Organizational ^g	4,218	17	-.24		-.27	.28	-.73, .19
CWB-Organizational ^j	3,200	10	-.17		-.20		
CWB-Interpersonal ^e	231	1	-.12		-.14		
CWB-Interpersonal ^k	1,242	4	-.17		-.19	.17	-.47, .09
CWB-Interpersonal ^g	1,983	7	-.27		-.31	.39	-.94, .33
CWB-Interpersonal ^h	2,620	11	-.16		-.18		
Supervisor-Directed Aggression ^e	638	3	-.28		-.34	.31	-.85, .17

Table 6.6 Relations among justice variables and CWB: Summary from meta-analyses (continued)

Measure	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	90% CI
Supervisor-Directed Aggression ^j	2,050	8	-.45	-.51			
Coworker-Directed Aggression ^j	2,620	11	-.16	-.18			
Abuse ^g	146	1	-.14	-.17			
Production Deviance ^g	235	2	-.11	-.13		.10	-.30, .03
Sabotage ^g	1,766	6	-.20	-.25		.27	-.69, .20
Theft ^g	147	1	-.05	-.05			
Withdrawal ^b	1,185	3	-.20	-.24		.05	-.32, -.16
Withdrawal ^g	1,766	6	-.11	-.13		.16	-.39, .13
Interpersonal Justice – Entity-Based							
CWB Overall ^e	1,669	7	-.20	-.24		.12	-.44, -.04
CWB-Organizational ^e	1,013	3	-.14	-.17		.00	-.17, -.17
CWB-Interpersonal ^e	231	1	-.12	-.14			
Supervisor-Directed Aggression ^e	424	1	-.45	-.54			
Interpersonal Justice – Event-Based							
CWB Overall ^e	374	3	-.20	-.23		.00	-.23, -.23
CWB-Organizational ^e	704	3	-.19	-.21		.00	-.21, -.21
Supervisor-Directed Aggression ^e	214	2	.05	.06		.25	-.35, .47
Interpersonal Justice – Organization-Focused							
CWB Overall ^e	173	1	-.16	-.17			
CWB-Organizational ^e	704	3	-.19	-.21		.00	-.21, -.21
Interpersonal Justice – Supervisor-Focused							
CWB Overall ^e	1,870	9	-.20	-.24		.10	-.40, -.08
CWB-Organizational ^e	1,013	3	-.14	-.17		.00	-.17, -.17
CWB-Interpersonal ^e	231	1	-.12	-.14			
Supervisor-Directed Aggression ^e	638	3	-.28	-.34		.31	-.85, .17

Note. *N* = total sample size; *k* = number of effect sizes; *r_{obs}* = mean, sample size-weighted correlation; *SD_r* = standard deviation of *r*; *ρ* = meta-analytic correlation – see numerical superscripts for details on criterion measurement and corrections applied; *SD_ρ* = standard deviation of *ρ*; CI = credibility interval. Values for CI were computed when sources did not originally report them but provided *ρ* and *SD_ρ*. Data bars for *ρ* are scaled from .00 to 1.00 and reference absolute values; gray bars indicate negative and black bars indicate positive mean effects. Data sources: ^a Pitariu et al. (2008); ^b Carpenter & Berry (2014); ^c Chang (2015); ^d Taylor (2012); ^e Colquitt et al. (2013); ^f Berry, Carpenter, & Barratt (2012); ^g Cochran (2014); ^h Sulea et al. (2010); ⁱ Cohen-Charash & Spector (2001); ^j Hershcovis et al. (2007); ^k Berry, Ones, & Sackett (2007); ^l Griffeth, Hom, & Gaertner (2000); ^m Dalal (2005). ¹ self-report; ² non-self-report; ³ corrected for indirect range restriction; ⁴ reported as is from meta-analysis.

these behaviors are also meaningfully driven by volatile emotional states.

In addition to explaining how employees engage in counterproductivity, there has been extensive investigation into moderators of injustice's influence on counterproductivity. A prime example of these studies was conducted by Holtz and Harold (2010), who argued that individuals have options for how they might respond to experiences of injustice in the workplace. While some people believe that retaliation best restores justice, employees may purposely choose not to seek revenge against their transgressors. Some employees may think that inaction indicates moral superiority. Others may simply utilize other coping techniques, such as venting to friends or even forgiveness. Holtz and Harold specifically considered employees' interpersonal justice values, which refer to individuals' values of respect, politeness, dignity, and propriety, as well as their justice orientations, the extent to which they are aware of injustice and strive to uphold justice. While interpersonal justice negatively predicts CWB, this relationship is moderated by both interpersonal justice values and justice orientation. Employees with strong interpersonal justice values or justice orientations – those individuals who most highly value justice – were less likely to engage in workplace deviance, even when they experienced interpersonal injustice.

While scholars have long recognized the influence of individual differences on justice perceptions and counterproductivity, these investigations have been extended to examine specific traits as resources. For example, in examining employees' perceptions of justice of work–life balance initiatives, Beauregard (2014) demonstrated the influence of perfectionism on the justice–CWB link. Specifically, she examined maladaptive and adaptive perfectionism. Individuals high on adaptive perfectionism, a narrow component of conscientiousness, respond constructively to stressors and persist to achievement. In contrast, individuals who display maladaptive perfectionism, a component of neuroticism, tend to select ineffective coping mechanisms, such as anger and aggression. In light of these tendencies, adaptive perfectionism can be viewed as a resource that helps buffer the strains of injustice, while maladaptive perfectionism exacerbates this negative experience. Both adaptive and maladaptive perfectionism moderated the relationship between informational justice and CWB-I, such that the relationship was weaker for individuals with high levels of adaptive perfectionism and stronger for individuals with high levels of maladaptive perfectionism. While these preliminary findings only introduce the potential buffering effects of these underexplored individual

differences variables, they highlight several opportunities for future directions. Perhaps adaptive and maladaptive perfectionism shed light on how people respond to other strains, such as boredom. Some individuals who experience insufficient stimulation at work pursue challenges for self-improvement, while others exploit the opportunity to engage in loafing behaviors. Such potential as a boundary condition might also help explain these discrepancies in employee responses to strains.

Another potential resource that may reduce the undesirable effects of injustice is identity. In a primary study of Chinese employees, scholars examined the influence of collective, relational, and individual identities on the relationship between interpersonal unfairness and CWB (L.-Q. Yang, Johnson, Zhang, Spector, & Xu, 2013). Because individuals who score high on collective and relational identities define themselves in light of their relationships with others and seek the welfare of that unit, they have distinct resources beyond those who ascribe to an individual identity. Individuals high on collective and relational identities are posited to build social capital that can provide necessary support in the face of job demands such as injustice. In addition, because they seek the common good of the unit, they are less likely to exhibit behaviors that may harm others. When collective and/or relational identities are high, the relationship between interpersonal unfairness and CWB is weakened. This unique view of the influence of identities not only furthers understanding of the intersection of justice and counterproductivity but also extends knowledge of deviance phenomena outside of the Western context that has dominated the scholarly literature so far.

Ho and Gupta (2014) also investigated deviance in an underexamined context. Several characteristics of the Singaporean context have implications for CWB research. In Singapore, conformity to norms is highly valued and high-level sanctions are typically implemented in response to norm violations. Therefore, the researchers did not anticipate, or demonstrate, a meaningful main effect between customer interactional injustice and customer-directed CWB in this context. However, they detected two important moderators that may help employees overcome the social costs of retaliatory behaviors – self-efficacy and supervisor social support. First, individuals with higher self-efficacy may view customer injustice as particularly unwarranted and therefore take action to restore their beliefs about their own standing. Second, supervisor social support increases an employee's status within the organization and decreases the chances of being punished. Both self-efficacy and support thereby diminish the costs of retaliation such that the apparent benefits may outweigh

the costs. Employees with higher self-efficacy as well as those who perceived greater supervisor social support engaged in customer-directed CWB when exposed to customer interactional injustice. These findings suggest several opportunities for future research. Strikingly, social support, which typically corresponds with positive outcomes, empowered employees to engage in undesirable behaviors. As organizations frequently encourage and foster organizational and social support for their employees, more detailed investigations into their potential negative consequences would be welcome. Also, in Ho and Gupta's Singaporean study, supervisor social support was substantially more influential than coworker social support. Perhaps this is due to the high power distance in that context. Future studies might investigate the influence of coworker support in cultures with less power distance or work environments with less managerial presence or oversight. Also fruitful might be investigations into the strength of numbers. For example, perhaps employees who work in large groups that frequently experience interpersonal injustice (e.g., female workers harassed in bars) might derive social support from their colleagues and thereby feel empowered to retaliate against their transgressors.

Overall, substantial research has demonstrated the importance of justice in understanding and predicting work counterproductivity. Most notably, recent research has moved beyond investigating the main effects of justice to attempting to explain how and when these effects occur. As exemplified by the few studies highlighted, these investigations have proven particularly meaningful because important moderators and insightful mediators have been identified. As this research area continues to mature and an abundance of nuanced investigations surface, scholarship that replicates and integrates these many narrow findings will be particularly useful. The proliferation of small, primary studies suggests the need for substantial replication across national and occupational contexts. Large-scale empirical studies are needed to better understand how state and trait variables interact to influence these mechanisms. Additionally, conceptual work consolidating the many studies occupying similar construct domains under different labels would substantially enhance future theory-building and practical applications.

Organizational justice and CWB con-

structs: Review of meta-analytic findings

Distributive justice relates negatively with CWB, though the relationships are small to modest (mean $\rho = -0.16$ across 10 meta-analyses; see Table 6.6). Similarly, modest negative relationships exist with

organizational CWB, interpersonal CWB, and supervisor-directed aggression (mean ρ for each is $-.14$). Distributive justice demonstrated relationships of comparable magnitude with coworker-directed aggression, sabotage, and turnover (ρ s = $-.13$, $-.18$, and $-.11$, respectively). The effect of distributive justice on CWB is moderated by the type of justice; stronger effects were exhibited with entity-based ($\rho = -.24$) and organizationally focused distributive justice ($\rho = -.27$).

Procedural justice consistently demonstrates negative relationships with CWB constructs. Eleven meta-analyses have examined the relationship between procedural justice and overall CWB; across meta-analyses, the average corrected correlation is $-.24$ (unit weighted). Corresponding relationships for organizational CWB and interpersonal CWB are of comparable magnitude (ρ s = $-.22$ and $-.21$, respectively). Whereas coworker-directed aggression correlates with procedural justice at a similar level as with CWB-I and CWB-O ($\rho = -.20$), the relationship with supervisor-directed aggression is more pronounced (mean $\rho = -.30$), suggesting that individuals who perceive procedural injustice are more likely to act out toward supervisors than coworkers. Supervisors, rather than coworkers, may be seen as the instigator of the injustice. Also supporting a retaliatory component underlying the procedural justice–CWB link, procedural justice demonstrates a moderately strong relationship with sabotage ($\rho = -.32$). In contrast, withdrawal constructs weakly relate to procedural justice (average ρ s approximating $-.11$).

Event-based procedural justice strongly negatively influences supervisor-directed aggression ($\rho = -.39$) and more modestly relates to organizational CWB and interpersonal CWB (average $\rho = -.22$). Organization-focused procedural justice demonstrates weaker effects with both supervisor-directed aggression ($\rho = -.24$) and interpersonal CWB ($\rho = -.16$). Reflecting the match between the predictor and the criterion, the relationship between organization-focused procedural justice and organizational CWB is more pronounced ($\rho = -.29$; overall CWB $\rho = -.32$). Supervisor-focused procedural justice correlates substantially negatively with supervisor-directed aggression ($\rho = -.37$), in contrast to comparatively modest relationships with other CWB constructs (ρ s averaging $-.20$). These findings further suggest that target-specific retaliation may be occurring.

Informational justice correlates with overall CWB (average $\rho = -.27$), interpersonal CWB (average $\rho = -.30$), and supervisor-directed aggression ($\rho = -.31$); it relates more modestly to organizational CWB (average $\rho = -.21$). Relations of informational justice with specific forms of

organizational CWB – such as production deviance, sabotage, theft, and withdrawal – range between $-.17$ to $-.26$. The type of informational justice (e.g., event- and entity-based) does not appear to moderate relationships with CWB constructs.

The majority of the meta-analyses relating to interactional justice rely on relatively small datasets with a limited number of studies and total participants. Due to this, the effect size estimates for interactional justice's relationships with each CWB construct (e.g., across all overall CWB meta-analyses) fluctuate to a surprisingly large extent. Interpreting which forms of CWB are best predicted by interactional justice is meaningless without stable, robust meta-analytic evidence. However, rough averages of corrected correlations for the various CWB manifestations with interactional justice approximate $-.20$. Future work should attempt to integrate the various meta-analytic studies to string a cogent framework for interactional justice's relationship with the counterproductive behavioral domain.

Interpersonal justice displays patterns of relationships similar to those of procedural and informational justice, though the magnitude of effects appears to be somewhat stronger. Interpersonal justice and overall CWB demonstrate moderate negative relationships ($p = -.28$). Both organizational CWB and interpersonal CWB correlate modestly with interpersonal justice (ps average $-.18$ and $-.20$, respectively). Supervisor-directed aggression correlates substantially with interpersonal justice (average $p = -.43$), in contrast to coworker-directed aggression ($p = -.18$). This suggests the same entity-based retaliatory mechanism discussed earlier regarding procedural justice. Entity-based interpersonal justice correlates very strongly ($p = -.54$) with supervisor-directed aggression, while supervisor-focused interpersonal justice correlates moderately strongly ($p = -.34$) with supervisor-directed aggression. These two relationships were reported in meta-analyses but are based on single samples, so these effect size estimates should be interpreted with caution.

In sum, all forms of organizational justice have non-negligible relationships with manifestations of CWB. These effects are particularly pronounced for procedural and interpersonal justice. Specifically, attending to procedural and interpersonal justice in an organizational setting should yield substantial benefits to employers seeking to avoid and reduce manager- and supervisor-directed aggressive behaviors.

Politics

Adding to the repertoire of perceptual variables, organizational politics is the extent to which an organization pursues its self-interests to the

detriment of some and the benefit of others (Cropanzano, Howes, Grandey, & Toth, 1997). Internal entities (individuals, groups, factions, etc.) vie for power in a dynamic system. At the individual level of analysis, organizational politics research centers on dysfunctional activities, despite its acknowledgment that politics may be used benevolently (C.-H. Chang, Rosen, & Levy, 2009). Highly political environments are strongly tied to perceptions of low procedural and interactional justice ($p = -.63$ and $-.68$, respectively; Bedi & Schat, 2013). Additionally, negative relations with job satisfaction ($p = -.49$) and organizational commitment ($p = -.42$) and positive links with stress ($p = .41$) and burnout ($p = .35$) provide compelling support that an organization characterized by a political atmosphere is an environment primed for employee counterproductivity. Meta-analytic correlation estimates between absenteeism and perceptions of politics are staggering ($p = .42$) with even more prominent relationships between politics and CWB ($p = .50$).

Justifications for the link between CWB and political environments appear to focus on personological variables. Honesty-Humility (H-H; Lee & Ashton, 2005) appears to interact with a political environment to predict CWB (Wiltshire, Bourdage, & Lee, 2013; Zettler & Hilbig, 2010). Low H-H individuals are at a much greater risk of committing CWB in the face of organizational politics than when faced with more supportive organizations. Wiltshire et al. suggest that political environments require employees to adapt behaviors to gain an advantage. People low in H-H are more likely to adapt aversive behaviors as a reaction to their organizational environment. Others assume an emotional approach such that a political ecosystem is threatening and thereby induces stress, anxiety, and dissatisfaction (Cropanzano et al., 1997; Vigoda, 2002).

To understand organizational political behavior, a review of the measures and items employed is helpful. Kacmar and Carlson (1997) published a revised version of an earlier perceived organizational politics scale with three factors: (1) general political behavior (e.g., 'People in this organization attempt to build themselves up by tearing others down', 'There has always been an influential group in this department that no one ever crosses'), (2) go along to get ahead (e.g., 'Agreeing with powerful others is the best alternative in this organization', 'It is best not to rock the boat in this organization', 'Telling others what they want to hear is sometimes better than telling the truth'), and (3) pay and promotion policies (e.g., 'None of the raises I have received are consistent with the policies on how raises should be determined', 'When it comes to pay raise and promotion

decisions, policies are irrelevant'). The first factor appears to measure organizational norms of maltreatment and subversion of organizational policies. It is of little surprise that such subversive and counternormative behavior begets future counterproductive behavior. Next, going along to get ahead assesses norms of an organization and examines how leaders treat subordinates. This factor seems reminiscent of aspects of tyrannical leadership and petty leadership combined with in-group/out-group behaviors. Pay and promotion policies comprise an eclectic justice measure. It comes as no surprise that poor perceptions of justice are associated with future counterproductive behaviors, likely as retaliation. In summary, measures of organizational politics appear to reflect an overall climate of the organization characterized by its tolerance of subversive behavior, the presence of a bourgeois ruling class, and the tendency of the ruling class to deviate from organizational policies; therefore, its substantial relationships with CWB align well with the criterion's established nomological network.

Relational Influences

Positive effects of leadership

The influence of employees' work environment and daily interactions on performance is undeniable. Although the effects of supportive work environments on extra-role behaviors were long suspected, scholars have recently begun to investigate this important relationship in more detail. Shapira-Lishchinsky and Tsemach (2014) examined the role of authentic leadership on employees' organizational citizenship behaviors (OCB) and withdrawal. Authentic leaders fostered psychological empowerment among their employees, and various dimensions of psychological empowerment led to increased OCB and decreased absenteeism. Positive leadership styles have also been found to improve employees' perceptions of justice in light of stressors, ultimately improving work performance (Zhang, LePine, Buckman, & Wei, 2014). Relatedly, positive work climate also negatively influences CWB (Jayasuriya, Javasinghe, & Wang, 2014).

Mentoring has also garnered research attention (see Table 6.7 for meta-analytic evidence of mentoring and leadership effects). Mentored individuals appear to engage in slightly fewer CWB than non-mentored individuals. Small relationships are exhibited with overall CWB, withdrawal intentions, and withdrawal behaviors (ρ s = $-.07$, $-.10$, and $-.07$, respectively). However, the dichotomous assessment of mentoring likely produces a

ceiling on this relationship; this link could potentially be stronger if the mentoring variable were better quantified in primary studies (i.e., levels of amount or quality of mentoring). Expanding mentoring variables to include such interval-level data, more deeply investigating the quality of mentoring received, and examining potential moderating effects of the mentor-mentee pairing processes (e.g., both mentor and mentee are minority group members) may help advance our understanding of the mentoring-CWB relationships as well as guide organizations seeking to benefit from implementing these supportive programs.

Another positive influence on employee behaviors, leader-member exchange (LMX) has a history of use in research involving turnover. Average correlations of LMX with turnover intentions are moderate ($\rho = -.35$) and with turnover small (average $\rho = -.15$). Several meta-analytic studies have examined the relationship of LMX with overall CWB ($\rho = -.14$) as well as accidents and injuries ($\rho = -.16$). Considering the effects of LMX on CWB and many other criteria of interest, organizations may seek to foster LMX. Examinations of the relationships of LMX with other specific forms of deviance, such as substance abuse, production deviance, and others, might be fruitful.

Negative effects of leadership

Poor leadership influences well-being and behavior of followers. Hershcovis et al. (2007) point out that 'poor leadership encompasses a range of leadership perceptions and behaviors, including perception of supervisor hostile verbal and nonverbal behavior (Zellars, Tepper, & Duffy, 2002), over-control (Dupré, 2003), authoritarian management style (Marrs, 1999), and lack of charismatic leadership (Hepworth & Towler, 2004)' (2007, p. 231). Poor leadership is moderately positively associated with overall CWB as well as organizational CWB and coworker-directed CWB (ρ = $.26$, $.21$, and $.16$, respectively). The effect of poor leadership with supervisor-directed aggression is substantially stronger ($\rho = .52$); this relationship could be explained by direct retaliation against poor leadership or a bidirectional relationship in which supervisors also display poor leadership behaviors as a result of their victimization. Overall, both leaders and followers benefit from optimizing the leader-follower relationship. Traditionally positive leadership behaviors (e.g., motivating others, inspiring others) in general are negatively correlated with CWB ($\rho = -.48$, controlling for same-source bias).

Accompanying the growth of research on supervisor-subordinate relations, some researchers have explored the effects of supervisory action

Table 6.7 Relations among mentoring and leadership variables and CWB: Summary from meta-analyses

Measure	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	ρ	<i>SD_ρ</i>	90% <i>CI</i>
Mentoring²							
CWB Overall ^{a,1}	3,494	15			-.07	.02	-.10, -.04
Withdrawal Intentions ^{a,1}	3,152	7			-.10	.03	-.15, -.05
Withdrawal ^{a,1}	4,423	18			-.07	.08	-.20, .06
Leader–Member Exchange							
CWB Overall ^b	453	2			-.14		
Turnover Intentions ^c	11,790	38	-.34		-.39	.07	-.51, -.27
Turnover Intentions ^d	1,074	8	-.28		-.31		
Turnover ^c	1,345	9	-.15		-.17	.18	-.47, .13
Turnover ^e	161	3	-.21		-.25		
Turnover ^d	856	7	-.03		-.04		
Accidents/Injuries ^f	1,585	7	-.14		-.16	.00	-.16, -.16
Trust in Supervisor							
CWB Overall ^b	453	2			-.21		
Leadership Behaviors							
CWB Overall ^{g,3,5}	2,469		-.67		-.90		
CWB Overall ^{g,4,5}	435		-.22		-.48		

Note. *N* = total sample size; *k* = number of effect sizes; *r_{obs}* = mean, sample size-weighted correlation; *SD_r* = standard deviation of *r*; ρ = meta-analytic correlation – see numerical superscripts for details on criterion measurement and corrections applied; *SD_ρ* = standard deviation of ρ ; *CI* = credibility interval. Values for *CI* were computed when sources did not originally report them but provided ρ and *SD_ρ*. Data bars for ρ are scaled from .00 to 1.00 and reference absolute values; gray bars indicate negative and black bars indicate positive mean effects. Data sources: ^a Eby et al. (2008); ^b Colquitt et al. (2013); ^c Dulebohn et al. (2012); ^d Gerstner & Day (1997); ^e Griffeth, Hom, & Gaertner (2000); ^f Christian et al. (2009); ^g Viswesvaran, Schmidt, & Ones (2005). ¹ random-effects meta-analysis results; ² not mentored = 0, mentored = 1; ³ supervisor-rated; ⁴ supervisor–peer convergence; ⁵ corrected for interrater reliability.

on subordinate CWB. Destructive leadership refers to ‘the systematic and repeated behavior by a leader, supervisor or manager that violates the legitimate interest of the organization by undermining and/or sabotaging the organization’s goals, tasks, resources, and effectiveness and/or the motivation, well-being or job satisfaction of subordinates’ (Einarsen et al., 2007, p. 208). This broad classification subsumes many narrower labels for counterproductive leaders, including petty tyrants, health endangering leaders, abusive leaders, and toxic leaders, among others. Krasikova, Green, and LeBreton (2013) clarified this construct by distinguishing between leaders who engage in counterproductive behaviors and those who

engage in destructive behaviors. In contrast to the aforementioned ‘poor leaders’ who commit CWB themselves, destructive leaders may either directly harm their followers or influence them to pursue goals that are contrary to organizational interests (i.e., direct their employees to engage in CWB); thus, destructive leadership behaviors are not merely behaviors of a leader but instead components of the leader–follower relationship.

‘Dark’ forms of leadership have garnered substantial research attention in recent years, facilitating a meta-analysis on the outcomes of destructive leadership. Across 19 studies and 7,610 participants, subordinates’ experiences of destructive leadership strongly correlated with their CWB

($r = .38$) as well as yielding negative consequences to job satisfaction ($r = -.34$) and turnover intentions ($r = .31$; Schyns & Schilling, 2013). The authors suggested that the strong relationship between destructive leadership and CWB could be due to retaliation against the supervisor or organization, followership of poor role models, or a culture of negative work behaviors. In a small sample of Australian employees, a primary study demonstrated that not only were negative supervisor behaviors related to follower counterproductivity but also that the influence of negative leadership was more powerful than positive leader behaviors (Karimi, Gilbreath, Kim, & Grawitch, 2014).

The most common approach to studying destructive leadership asks subordinates about their experiences as victims of supervisor abuse (Tepper, 2000). While that approach is promising to examine the effects of supervisor behaviors on their victims, Ogunfowora (2013) furthered understanding of the effects of abusive supervision by examining how it influences employees at the work group unit. He demonstrated that abusive supervision variability, the unit-level phenomenon when a supervisor exhibits different levels of abuse to different employees in a group, made the weak interpersonal justice climate more salient and thereby increased the counterproductivity of the group. Consequences of destructive leadership extend beyond those who are victimized, negatively influencing the work climate and inducing undesirable behaviors from those who are exposed to the abuse.

Similar to other predictors of counterproductivity, destructive leadership influences employees differently based on individual differences as well as contexts. A key component to the relationship between destructive leadership and counterproductivity is recognition of which party is at fault in a given situation. The organization may be seen to play a role in the abuse by granting authority and retaining an abusive supervisor. Individuals who experience abusive supervision perceive less organizational support and consequently engage in more organizationally targeted CWB (Shoss, Eisenberger, Restubog, & Zagenczyk, 2013). However, the relationship between abusive supervision and perceived organizational support is moderated by the extent to which employees identify their supervisors with the organization (i.e., supervisor's organizational embodiment). Employees perceive less organizational support when they identify their abusive supervisors more strongly with the organization at large.

Employees may also respond differently to destructive leadership based on experiences within their workplace. For example, Mitchell and Ambrose (2012) found that fear of retaliation

minimized the relationship between supervisor aggression and retaliation against the supervisor and displaced aggression toward coworkers. They also demonstrated substantial effects of aggressive modeling, such that employees who had been exposed to norms of aggression were more likely to display aggressive behaviors if abused.

Individual differences also moderate the relationship between destructive leadership and CWB. Several studies have demonstrated the moderating effects of locus of control on this relationship, such that individuals who demonstrate low or internal locus of control are more likely to engage in a variety of counterproductive behaviors, including retaliation, displaced aggression (i.e., coworker aggression), sabotage, production deviance, and theft when they are exposed to supervisor aggression (Mitchell & Ambrose, 2012; Wei & Si, 2013). Similarly, the Big Five dimensions typically associated with integrity also influence these relationships. In a small Romanian study, higher levels of conscientiousness, agreeableness, and emotional stability weakened the relationship between abusive supervision and CWB-O (Sulea, Fine, Fischmann, Sava, & Dumitru, 2013).

Although the majority of studies on the link between abusive supervision and subordinate CWB have assumed that abusive supervision leads to subordinate CWB, Lian and colleagues (Lian et al., 2014) empirically questioned the assumed direction of these effects using two cross-lagged studies. First, they assessed participants' perceptions of abusive supervision and CWB twice, separated by a 20-month lag. Surprisingly, results demonstrated that organizational deviance had a significant lagged effect on abusive supervision, but not the opposite effect. The authors questioned whether 20 months was too long to assess subordinate reactions to supervisor behaviors. Perhaps, employees who stayed 20 months after abuse were different from those who chose to leave the organization. Stayers might be less likely to react to abuse due to perceptions of powerlessness. In their second study, utilizing a six-month lag, significant effects occurred in both directions. However, abusive supervision predicted organizational deviance only when respondents indicated low self-control capacity and high intention to quit, lending support for the authors' rationale regarding stayers versus leavers.

Destructive leader behaviors have captured the interest of academics and practitioners alike, and the notable consequences of these harmful behaviors have been demonstrated in several primary studies. However, as Lian and colleagues demonstrated, these relationships are not as straightforward as many have assumed. Further research into how other interpersonal and

environmental effects on CWB might be reciprocal is necessary. As indicated by the body of work reviewed above, the boundary conditions of destructive leadership's effects on employees' CWB also warrant further exploration. This specific literature has not yet made the link to other mechanisms underlying CWB. Empirical work investigating how destructive leadership relates to stressors and justice will be particularly insightful. It is possible that destructive leadership shares many characteristics with other forms of stress employees experience. Investigations of similar breadth as those conducted within these scholarly domains will be particularly fruitful in exploring the influence of 'dark' leadership on employee counterproductivity.

Victimization

As discussed in the context of destructive leadership, being a victim of others' CWB can be traumatic and a major stressor (Vartia, 2001). Employees often experience painful workplace interactions that lead to harmful outcomes for both organizations and their members, and these negative interactions are not restricted to only supervisor-subordinate relationships. Employees can also be negatively influenced by their interactions with coworkers or customers or by observing the hostile interactions of others.

Workplace bullying is a social stressor that influences employee performance both directly and indirectly through affective-based variables (Devonish, 2013). The documented effects of workplace bullying include decreased task performance via decreased job satisfaction, decreased interpersonal OCB via work-related depression, and increased interpersonal CWB through both dissatisfaction and depression. Other, seemingly less aggressive, forms of workplace mistreatment can also be detrimental to employees. Workplace ostracism, when employees are ignored or excluded, also positively influences CWB, especially for individuals who display low proactive personality and political skill (Zhao, Peng, & Sheard, 2013). Zhao and colleagues suggest that the ostracized resort to CWB as a coping mechanism. After unsuccessfully seeking opportunities to improve their workplace situations, these individuals use CWB for retaliation. Zhao and colleagues posit that those who are high in proactive personality and political skill are more capable of improving dissatisfactory workplace conditions or experiences; therefore, such employees will find more effective, active coping mechanisms than CWB.

The psychological toll of incivility, abuse, bullying, harassment, undermining, or other counterproductive acts have been associated with higher rates of depression, psychosomatic issues, stress,

musculo-skeletal problems, burnout, anxiety, and job dissatisfaction, to name a few (Bowling & Beehr, 2006; Cortina & Magley, 2003; Niedl, 1996; Vartia, 2001). Incivility – described as low-intensity, discourteous, callous behaviors that violate social norms with ambiguous intentions of harm (Cortina, Magley, Williams, & Langhout, 2001) – is three times as likely to stem from a superior and is almost 2.5 times as likely to be perpetrated by men (Pearson, Andersson, & Porath, 2000). The source of incivility, whether initiated by supervisors or coworkers, slightly influences its outcomes (S. Lim & Lee, 2011). Supervisor-instigated incivility relates more strongly to job stress and work-family conflict than coworker-instigated incivility.

Incivility has a negative impact on others' attitudes, affect, and behaviors. This influence may be of a direct nature, vicariously experienced, or through ambient means (Robinson, Wang, & Kiewitz, 2014). Direct experiences provoke strong affective, attitudinal, and behavioral responses and have received the most scholarly attention. Less well studied is the vicarious course of influence wherein the focal employee is not the target but experiences malevolent behaviors directed at others. Vicarious influence is analogous to effects described in bystander research, where somebody bears witness to deviant acts of others (Ferguson & Barry, 2011). Research finds deflated emotional states and reduced affect in the presence of vicarious incivility (Robinson et al., 2014) but mixed responses in the frequency of voluntary and deviant behaviors. Ambient impact describes the influence of more diffuse but pervasive, ongoing misbehavior (i.e., a persistent pattern of behavior that creates a culture of deviance).

Robinson et al.'s (2014) annual review article focuses exclusively on coworker interactions. While thorough in their review, they purposefully neglect experiences caused by supervisors, subordinates, and outsiders who perpetrate CWB. Several constructs of deviance sprang forth with the explicit intention to assess misbehavior experienced from supervisors (e.g., abusive supervision, destructive leadership). Comparison of outcomes from the multiple possible sources of perpetrators may illuminate distinct reactions and perceptions associated with them. As demonstrated in the retaliation literature, targets of CWB have been known to strike back, particularly when the formal justice system is perceived to be inadequate (Skarlicki & Folger, 1997). In their trickle-down model, Mawritz, Mayer, Hoobler, Wayne, and Marinova (2012) found evidence that mistreatment from the upper echelons was related to higher levels of middle-tier management abusive supervision which, in turn, was related to higher levels of

group-level interpersonal deviance. Considering incivility predictably cascades downward, employees may not have a formal judicial channel to report their supervisors, and employees backed into a proverbial corner may have no option for retribution other than retaliation. The cycle of perceived victimization, negative experiences, followed by propagation of incivility has also been referred to as the spiral of incivility (Andersson & Pearson, 1999). Spiraling incivility claims that behaviors begin as low-intensity but may progress into more impactful and intense behaviors due to retaliatory reactions (Bunk, Karabin, & Lear, 2011). Support for a trickle-down model and a progressive spiral of incivility is still tenuous and deserves further attention. An equally likely explanation is that pervasive incivility is due to an overall antisocial culture and/or climate. In an organizational climate where deviance is an entrenched behavioral pattern, such behavior is further fostered as employees are tacitly given the green light to mimic it. This might be described as a few bad apples spoiling the barrel – or the rotten barrel spoiling the apples (O'Boyle, Forsyth, & O'Boyle, 2011).

Suffering from incivility at work also has an impact on one's life outside the sphere of work (Ferguson, 2012). Negative responses to incivility tend to have spillover effects which influence one's mood at home and sour interactions with friends and family. Extended bouts of experienced incivility lead to greater symptoms of stress (Cortina et al., 2001), causing a ripple effect. Incivility at work has been found to negatively impact one's marital satisfaction and has even been linked to reducing the partner's marital satisfaction as well (Ferguson, 2012).

Victimization and CWB constructs:

A summary of meta-analytic findings

Being a victim of harmful interpersonal behaviors is linked to many detrimental outcomes across different types of criteria (see Table 6.8 for a summary of meta-analytic results). Job performance, the dominant criterion in IWO psychology, is modestly negatively correlated with being a victim of a supervisor's behavior, demonstrating meaningful relationships with both perceptions of abusive supervision ($\rho = -.19$) and destructive leadership ($r = -.20$). Similarly, abusive supervision is equally negatively related with enacting citizenship behaviors ($\rho = -.24$). Quite interestingly, no meta-analyses have explored the influence of general incivility, coworker undermining, customer or subordinate abuse, sexual assault, bullying, or any other form of victimization on job performance. Further still, the abusive supervision and destructive leadership constructs are often

measured through a perceptual lens rather than actual supervisor behaviors. Individual differences among the victims themselves (e.g., neuroticism) may influence these relationships. The direction of these relationships is also poorly understood. Just as employees may respond negatively to abusive supervision, a supervisor may become hostile toward a consistently underperforming employee. While the true nature of events probably lies somewhere in-between, causal, and even bidirectional investigations must attempt to uncover the mechanisms underlying victim status and future performance.

Across all CWB criteria, victimization (being a victim of others' misbehavior) relates notably to engaging in CWB. Regarding overall CWB, little variability of effect sizes exists across differing types of victimization (ρ s range from .36 to .41). More nuanced findings are reported for organizational and interpersonal CWB, which were assessed in relation to aggression from various specific perpetrators (e.g., supervisor, coworker, outsider). Effects with CWB-O vary based on perpetrator such that the relationship between victimization and CWB-O is stronger when the aggression stems from supervisors ($\rho = .41$ and .39 for abusive supervision and supervisor aggression, respectively) than from coworkers or outsiders ($\rho = .29$ and .20, respectively). The opposite effect occurs for CWB-I. Victimization relates moderately strongly to CWB-I in the case of abusive supervision and supervisor aggression (ρ s = .35 and .34, respectively); however, this link is exacerbated when coworkers are the perpetrators ($\rho = .47$). Abusive supervision exhibits a staggeringly high correlation with supervisor-directed aggression ($\rho = .53$). This may be due to construct matching such that interpersonal CWB includes behaviors targeted toward coworkers in addition to supervisors, while supervisor-directed deviance only includes the latter. Understanding the mechanisms responsible for this dynamic (e.g., which events spark an initial confrontation) as well as determining the typical direction of this relationship (e.g., an initially aggressive employee is later treated more negatively) are vital before testing and implementing interventions. Withdrawal-related constructs, such as absenteeism, turnover intentions, job withdrawal, and work withdrawal are consistently positively related to victimization across perpetrating sources (average $\rho = .22$). Employees who experience bullying and sexual harassment withdraw as a result. Future research might investigate the extent to which levels of CWB spike immediately following major victimization events or continue to persist long after such events. The immediacy and duration of employees' CWB might also be influenced by the type of

Table 6.8 Relations among victimization variables and CWB: Summary from meta-analyses

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Performance Variables							
Performance							
Abusive Supervision ^a	4,012	16	-.17		-.19		.11 -.37, -.01
Destructive Leadership ^d	4,657	12	-.20				
Political Skill – Of Subordinate							
Abusive Supervision ^c	1,258	3	.21	.23			
Organizational Performance							
Destructive Leadership ^d	333	2	.04				
Overall OCB							
Abusive Supervision ^a	2,842	13	-.21		-.24		.05 -.32, -.16
CWB Variables							
Overall CWB							
Victimization Broadly Defined ^e	26,693	83			.36		.16 .10, .62
Abusive Supervision ^a	1,715	7	.37		.41		.24 .02, .80
Destructive Leadership ^d	7,610	19	.38				
Workplace Harassment ^b	2,584	9	.30		.37		.06 .27, .47
CWB-Organizational							
Abusive Supervision ^a	7,761	22	.36		.41		.13 .20, .62
Supervisor Aggression ^f	4,908	11	.34		.39		.13 .18, .60
Coworker Aggression ^f	2,439	7	.25		.29		.08 .16, .42
Outsider Aggression ^f	560	3	.18		.20		.12 .00, .40
CWB-Interpersonal							
Abusive Supervision ^a	3,726	13	.31		.35		.09 .20, .50
Supervisor Aggression ^f	3,692	11	.29		.34		.08 .21, .47
Coworker Aggression ^f	5,230	10	.38		.47		.11 .29, .65
Outsider Aggression ^f	995	4	.24		.28		.08 .15, .41
Supervisor-Directed Deviance							
Abusive Supervision ^a	5,223	14	.48		.53		.12 .33, .73
Absenteeism							
Workplace Harassment ^b	1,267	5	.06		.06		.06 -.04, .16
Workplace Bullying ^{g,2}	37,054	6	.12				
Workplace Bullying ^{g,3}	36,182	9	.11				
Turnover Intentions							
Supervisor Aggression ^f	7,474	16	.26		.30		.09 .15, .45
Coworker Aggression ^f	6,361	12	.20		.23		.08 .10, .36
Outsider Aggression ^f	1,268	6	.15		.17		.10 .01, .33

Table 6.8 Relations among victimization variables and CWB: Summary from meta-analyses (continued)

Measure	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	90% <i>CI</i>
Destructive Leadership ^d	6,034	11	.31				
Workplace Bullying ^g	13,205	11	.28				
Workplace Harassment ^b	13,961	24	.29		.35	.11	.17, .53
Job Withdrawal							
Sexual Harassment ^h	6,201	16	.13		.16		
Work Withdrawal							
Sexual Harassment ^h	4,940	12	.24		.30		
Resistance							
Destructive Leadership ^d	2,176	8	.30				
Personality Variables							
Emotional Stability – Subordinate's							
Abusive Supervision ^c	908	3	-.08	.14			
Neuroticism							
Abusive Supervision ^a	4,198	12	.10		.12	.19	-.19, .43
Neuroticism – Subordinate's							
Abusive Supervision ^c	2,703	6	.10	.20			
Negative Affect							
Abusive Supervision ^a	8,526	27	.33		.37	.14	.14, .60
Destructive Leadership ^d	6,860	15	.34				
Workplace Harassment ^b	7,441	24	.21		.25	.14	.02, .48
Negative Affect – Subordinate's							
Abusive Supervision ^c	8,633	27	.32	.20			
Negative Affect – Supervisor's							
Abusive Supervision ^c	632	3	.33	.34			
Anxiety							
Workplace Harassment ^b	4,918	16	.25		.31	.11	.13, .49
Extraversion							
Abusive Supervision ^a	2,879	6	-.02		-.03	.05	-.11, .05
Extraversion – Subordinate's							
Abusive Supervision ^c	1,858	2	-.01	.03			
Positive Affect							
Abusive Supervision ^a	2,503	8	-.16		-.18	.09	-.33, -.03
Destructive Leadership ^d	2,514	8	-.09				
Workplace Harassment ^b	2,293	8	-.08		-.09	.09	-.24, .06
Openness							
Abusive Supervision ^a	2,571	5	-.04		-.05	.13	-.26, .16
Agreeableness							
Abusive Supervision ^a	3,679	9	-.11		-.14	.07	-.26, -.02

(Continued)

Table 6.8 Relations among victimization variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Agreeableness – Subordinate's							
Abusive Supervision ^c	2,413	4	-.16	.11			
Conscientiousness							
Abusive Supervision ^a	4,368	12	-.12		-.14	.11	-.32, .04
Conscientiousness – Subordinate's							
Abusive Supervision ^c	2,413	4	-.06	.00			
Traditionality – Subordinate's							
Abusive Supervision ^c	1,222	4	-.14	.14			
Emotional Intelligence – Supervisor's							
Abusive Supervision ^c	889	5	-.43	.19			
Self-Control							
Workplace Harassment ^b	3,066	9	-.17		-.21	.14	-.44, .02
Core Self-Evaluations							
Destructive Leadership ^d	2,856	13	-.17				
Narcissism – Subordinate's							
Abusive Supervision ^c	665	4	.32	.25			
Machiavellianism – Supervisor's							
Abusive Supervision ^c	292	2	.29	.13			
Well-Being							
Destructive Leadership ^d	1,057	4	-.35				
Affective Variables							
Job Satisfaction							
Abusive Supervision ^a	6,560	17	-.31		-.34	.09	-.49, -.19
Destructive Leadership ^d	8,707	21	-.34				
Workplace Harassment ^b	19,871	42	-.32		-.39	.10	-.55, -.23
Organizational Commitment							
Destructive Leadership ^d	3,821	14	-.21				
Workplace Harassment ^b	9,224	16	-.30		-.36	.15	-.61, -.11
Organizational Commitment – Affective							
Abusive Supervision ^a	2,758	9	-.23		-.26	.04	-.33, -.19
Job Attitudes							
Destructive Leadership ^d	2,784	6	-.32				
Cynical Attribution							
Abusive Supervision ^c	1,566	4	.13	.47			
Attitude Toward Leader							
Destructive Leadership ^d	1,582	7	-.57				
Perceived Organizational Support							
Abusive Supervision ^a	1,603	7	-.34		-.40	.12	-.60, -.20
Life Satisfaction							
Workplace Harassment ^b	1,851	3	-.18		-.21	.00	-.21, -.21

Table 6.8 Relations among victimization variables and CWB: Summary from meta-analyses (continued)

Measure	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	ρ	<i>SD_ρ</i>	90% <i>CI</i>
Demographic Variables							
Gender¹							
Abusive Supervision ^a	24,563	83	-.05		-.06	.10	-.22, .10
Workplace Harassment ^b	2,921	11	-.05		-.05	.00	-.05, -.05
Gender – Of Supervisor¹							
Abusive Supervision ^a	2,624	14	-.13		-.13	.12	-.33, .07
Gender Dissimilarity							
Abusive Supervision ^c	880	4	-.05	.27			
Age							
Abusive Supervision ^a	23,079	77	-.03		-.03	.10	-.19, .13
Workplace Harassment ^b	4,822	16	-.04		-.04	.08	-.17, .09
Age – Of Subordinate							
Abusive Supervision ^c	28,571	65	-.04	.11			
Age – Of Supervisor							
Abusive Supervision ^a	1,265	7	-.06		-.06	.02	-.09, -.03
Abusive Supervision ^c	2,148	6	-.05	.25			
Education							
Abusive Supervision ^a	8,136	23	-.02		-.02	.08	-.15, .11
Tenure							
Workplace Harassment ^b	4,504	13	.01		.02	.02	-.01, .05
Tenure – With Supervisor							
Abusive Supervision ^a	8,669	31	.01		.01	.09	-.14, .16
Abusive Supervision ^c	10,654	28	.00	.08			
Organizational Tenure							
Abusive Supervision ^a	15,067	54	.02		.02	.06	-.08, .12
Organizational Tenure – Subordinate's							
Abusive Supervision ^c	15,731	42	.00	.06			
Position in Organization							
Abusive Supervision ^a	2,056	6	.05		.05	.06	-.05, .15
Stress and Strain Variables							
Job Tension							
Abusive Supervision ^a	1,777	5	.21		.24	.09	.09, .39
Role Ambiguity							
Workplace Harassment ^b	6,759	22	.24		.30	.12	.10, .50
Role Conflict							
Workplace Harassment ^b	5,429	16	.35		.44	.08	.31, .57
Role Overload							
Workplace Harassment ^b	7,343	25	.22				

(Continued)

Table 6.8 Relations among victimization variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Work – Family Conflict							
Abusive Supervision ^a	1,527	6	.32		.35		.13 .14, .56
Stress							
Destructive Leadership ^d	12,093	24	.24				
Stress – Supervisor's							
Abusive Supervision ^c	432	2	.16	.00			
Strain – Generic							
Workplace Harassment ^b	17,663	27	.29		.35		.08 .22, .48
Frustration							
Workplace Harassment ^b	3,613	16	.30		.40		.08 .27, .53
Burnout							
Workplace Harassment ^b	5,633	9	.33		.39		.16 .13, .65
Depression							
Abusive Supervision ^a	1,283	6	.21		.24		.14 .01, .47
Workplace Harassment ^b	5,625	16	.28		.34		.12 .14, .54
Emotional Exhaustion							
Abusive Supervision ^a	4,343	15	.32		.36		.12 .16, .56
Symptoms – Physical							
Workplace Harassment ^b	13,878	33	.25		.31		.11 .13, .49
Job Characteristics Variables							
Autonomy							
Workplace Harassment ^b	2,823	13	-.20		-.25		.06 -.35, -.15
Justice Variables							
Justice							
Destructive Leadership ^d	4,625	12	-.32				
Distributive Justice							
Abusive Supervision ^a	1,492	5	-.23		-.25		.13 -.46, -.04
Procedural Justice							
Abusive Supervision ^a	1,859	7	-.33		-.36		.08 -.49, -.23
Abusive Supervision ^c	610	3	-.21	.04			
Interactional Justice							
Abusive Supervision ^a	1,419	7	-.51		-.55		.06 -.65, -.45
Interactional Justice – Supervisor							
Abusive Supervision ^a	829	5	-.36		-.39		.19 -.70, -.08
Abusive Supervision ^c	717	3	-.43	.23			
Interpersonal Justice							
Abusive Supervision ^a	1,111	5	-.61		-.66		.00 -.66, -.66

Table 6.8 Relations among victimization variables and CWB: Summary from meta-analyses (continued)

Measure	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	90% CI
Leadership Variables							
LMX							
Abusive Supervision ^a	2,786	11	-.48		-.54		.12 -.74, -.34
Poor Leadership							
CWB Overall ^f	1,252	3	.19		.26		
CWB-Organizational ^f	1,215	4	.18		.21		
Supervisor-Directed Aggression ^f	1,716	8	.45		.52		
Coworker-Directed Aggression ^f	1,339	5	.14		.16		
Authoritarian Leadership							
Abusive Supervision ^a	1,139	6	.37		.41		.05 .33, .49
Ethical Leadership							
Abusive Supervision ^a	2,309	6	-.46		-.50		.25 -.91, -.09
Unethical Leadership							
Abusive Supervision ^c	2,702	10	.58	.35			
Transformational Leadership							
Abusive Supervision ^c	402	2	-.45	.15			
Supportive Leadership							
Abusive Supervision ^c	1,230	6	-.53	.33			
Power Distance – Subordinate							
Abusive Supervision ^c	3,699	13	.26	.19			
Power – Subordinate							
Abusive Supervision ^c	615	3	.03	.06			
Organizational Characteristics Variables							
Constraints – Organizational⁴							
Experienced Incivility ^j	732	5	.41	.14	.51		
Constraints – Work							
Workplace Harassment ^b	2,733	13	.44		.53		.14 .30, .76
Sanctions – Organizational							
Abusive Supervision ^c	530	2	-.32	.00			

Note. *N* = total sample size; *k* = number of effect sizes; *r_{obs}* = mean, sample size-weighted correlation; *SD_r* = standard deviation of *r*; *ρ* = meta-analytic correlation – see numerical superscripts for details on criterion measurement and corrections applied; *SD_ρ* = standard deviation of *ρ*; CI = credibility interval. Values for CI were computed when sources did not originally report them but provided *ρ* and *SD_ρ*. Data bars for *ρ* are scaled from .00 to 1.00 and reference absolute values; gray bars indicate negative and black bars indicate positive mean effects. Data sources: ^a Mackey et al. (2015); ^b Bowling & Beehr (2006); ^c Zhang & Bednall (2015); ^d Schyns & Schilling (2013); ^e Taylor (2012); ^f Hershcovis et al. (2007); ^g Nielsen & Einarsen (2012); ^h Willness, Steel, & Lee (2007); ⁱ Pindek & Spector (2016). ¹ male = 0, female = 1; ² longitudinal data; ³ cross-sectional data; ⁴ other-rated.

counterproductivity they engage in. For example, retaliatory behaviors might prove more effective emotion-focused coping mechanisms than withdrawal behaviors; therefore, employees who

engage in the former might cease these behaviors more quickly than those who select the latter.

In conjunction with personality, interesting and non-negligible relationships were found with

victimization. A large caveat must be addressed at the onset of this discussion; namely, it is still unclear whether certain characteristics (e.g., neuroticism) increase the likelihood of being targeted or whether innate characteristics bias the perceptions of victimization. Perhaps all team members are harassed equally but highly neurotic individuals report perceptions of harassment to a greater extent than their more emotionally stable peers.

The global dimension of neuroticism correlates to a modest extent with abusive supervision ($\rho = .12$, $r = .10$). Negative affect, as a subdimension of neuroticism, has a more prominent relationship with abusive supervision, workplace harassment, and destructive leadership ($\rho = .37$, $.25$, $r = .34$, respectively). The factor of extraversion bears essentially no relationship with abusive supervision but the positive affectivity component of extraversion displays a non-zero relationship with abusive supervision, workplace harassment, and destructive leadership ($\rho = -.18$, $-.09$, $r = -.09$, respectively). Akin to extraversion, openness to experience has no relationship with perceived abusive supervision ($\rho = -.05$). Alternatively, agreeableness and conscientiousness are similarly related to abusive supervision ($\rho = -.14$ for each). The factors of emotional stability, agreeableness, and conscientiousness, which jointly compose the higher-order trait of stability, all relate negatively to perceptions of victimization. Again, future research should examine whether instability enhances perceptions of victimization or whether unstable individuals are more likely to be targeted by perpetrators. Most personality research associated with victimization relies on a small number of studies with residual standard deviations large enough to suggest the presence of second-order sampling error. Additionally, some studies do not adequately address whether a given relationship is describing personality characteristics of the perpetrator or personality characteristics of the victim.

Across attitudinal variables, a consistent pattern of relationships emerges with victimization status (average $\rho = -.33$). Job satisfaction is virtually identically related to abusive supervision, workplace harassment, and destructive leadership ($\rho = -.34$, $-.39$, and $r = -.34$, respectively). Organizational commitment bears a similar pattern such that regardless of whether a supervisor or other employee executes the behavior, higher rates of victimization relate to lower levels of commitment (average ρ and r around $-.30$). Many different attitudinal variables exist in the literature but very few have been meta-analytically related to one's status as a victim. Further still, with the exception of job satisfaction and organizational commitment, only supervisors have been studied

as perpetrators in conjunction with job attitudes of victims. Given the extensive literature linking attitudes to performance and even various CWB criteria, this presents a clear gap in the literature. Future research into this domain may eventually allow for explanatory causal models demonstrating how victimization influences certain job attitudes and subsequent performance.

Interestingly, it appears as though gender, age, education, and position within the organization are largely unrelated to abusive supervision and workplace harassment. Counterintuitively, both sexes are roughly equivalently likely to experience harassment or abusive supervision (ρ s = $-.05$ and $-.06$, respectively) with men being slightly more likely recipients. Relationships of age, tenure, education, and position within the organization with workplace harassment and abusive supervision range from $-.06$ to $.05$.

Effect sizes between stress, strain, and victimization – operationalized as being subject of abusive supervision, workplace harassment, or destructive leadership – exhibited remarkable consistency. The average corrected correlation was $\rho = .34$ across many conceptions of stress and strain. Considering the many types of victimization that employees can experience in the workplace, it is surprising that additional forms of abuse (e.g., ostracism) have not been as heavily examined. Further, the stress and strain outcomes of victimization might vary based on the type of mistreatment endured. For example, do ostracism, abusive supervision, and coworker aggression that are experienced routinely lead to different types of stress outcomes and potentially even distinct behavioral strain responses?

Currently, abusive supervision is the key form of victimization that has been examined in relation to organizational justice, with the sole exception of destructive leadership's relationship with a broad conceptualization of justice ($r = -.32$). Logically, interpersonal justice has the largest correlation with abusive supervision ($\rho = -.66$), followed closely by the general interactional justice composite (average ρ s and r around $-.45$). Distributive and procedural justice are substantively related to abusive supervision but to a lesser degree (ρ s = $-.25$ and $-.36$, respectively). It should be noted that the k s on which these results are based range from 3 to 7, so these findings should be considered preliminary meta-analytic evidence. Hopefully, future investigations will bolster and improve upon these findings to facilitate more robust conclusions.

Due to their importance in a person's organizational and career trajectory, leaders have great opportunities to influence employee behaviors and attitudes. For example, LMX and

perceptions of abusive supervision are conceptually and empirically linked ($\rho = -.54$). Again, we see that poor leadership is robustly related to supervisor-directed aggression ($\rho = .52$). Poor leadership moderately positively relates to overall CWB and organizational CWB ($\rho = .26$ and $.21$) but less so to coworker-directed aggression. Certain leadership styles are additionally related, but not isomorphic with, abusive supervision. Notably, ethical and unethical leadership are indicative of perceptions of abusive supervision ($\rho = -.50$ and $r = .58$, respectively). Supportive, transformational, and authoritarian leadership styles exhibit comparable correlations with abusive supervision and (un)ethical leadership ($r_s = -.53, -.45$ and $\rho = .41$, respectively), which is somewhat higher than expected. Lastly, the power distance between a supervisor and their subordinate is moderately negatively related to abusive supervision; stronger perceptions of abusive supervision may be attributed to a greater power distance.

In summary, there are sizable and important relations such that employees who feel victimized generally perform worse, engage in more frequent acts of CWB, have worse attitudes about work, experience more stress and strain, and perceive greater injustice. However, an overwhelming number of these relationships are examined with only three forms of victimization: abusive supervision, workplace harassment, and destructive leadership. Worse still, many of these relationships rely entirely on perceptions of behavior (i.e., subordinate ratings of supervisors) with no regard for actually enacted behavior (i.e., leader self-reported or objectively measured). Given the economic and psychological consequences of victimization experiences such as bullying, ostracism, and sexual harassment, future primary studies should hone in on the relationships with these criteria. Expanding the literature in this regard will demonstrate the utility of interventions and aid those seeking to effectively implement them. Understanding how experiences of sexual harassment influence performance and attitudes may shed light on potential steps to help those struggling from such experiences. Additionally, as can be seen from Table 6.8, victimization correlates sizably with enacting CWB – and considering the perpetrators are inherently engaging in CWB in the first place – this may indeed indicate a vicious cycle of CWB within an organization or work group. Following the trickle-down model of abusive supervision (Mawritz et al., 2012) or the spiral of incivility (Andersson & Pearson, 1999), it is vital to intervene early in the process rather than waiting until such behaviors translate into organizational norms.

Person–situation interactions

For decades, scholars have accepted that a combination of individual and situational characteristics would best predict and explain employee performance. Within the past few years, intense research attention has been focused on exploring the *interactions* of specific individual traits, employee emotions, stressors, and organizational factors to better understand employees' deviant behaviors. A discussion of such interactions would be remiss without discussing situational strength. Long regarded as an important moderator of many individual difference–performance relationships, situational strength consists of how environmental cues signal the desirability of various behaviors in specific contexts (Meyer, Dalal, José et al., 2014). These cues then influence individuals to behave in ways that may not coincide with their natural tendencies.

Meyer et al. (2014) recently examined job-related situational strength by rigorously developing and validating a scale to assess situational strength at work and determining how the construct interacted with several individual differences variables. Notably, individual differences influenced perceptions of situational strength. Additionally, Meyer and colleagues examined various personality–performance relationships long assumed to be true, with surprising results. As predicted, the relationships of conscientiousness and agreeableness with OCB were moderated by situational strength such that these individual differences predicted OCB better in weak situations. However, for CWB, the opposite effect emerged. Situational strength moderated the effects of conscientiousness and agreeableness on CWB, such that both were more notable in strong situations. While this study greatly contributed to our current understanding of interactions between individual and situational characteristics as related to discretionary work performance, the results highlight the need for further insights into these unexpected mechanisms.

Stressors

Personality–situation interactions in the prediction of CWB have frequently been explored in regards to various work stressors. Stressors are well-established predictors of CWB, and an overview of meta-analytic estimates of those relationships is provided below. Interactive effects of personality with stressors are being increasingly explored, but relevant studies also highlight abundant literature gaps from an interactionist perspective. One such study, conducted by Zhou, Meier, and Spector (2014), explored the interrelationships of personality trait combinations, work

stressors, and CWB. In addition to demonstrating the isolated direct effects of work stressors and personality on CWB, the authors present novel relationships with various personality dimension pairings. Among all emotional stability–agreeableness combinations, interpersonal conflict predicted CWB-I and CWB-O best for people with low emotional stability and low agreeableness. The effects of organizational constraints on CWB-I and CWB-O were strongest for people with high emotional stability and low conscientiousness compared to other combinations of those traits. Their logic suggested that although one personality dimension may predict CWB, strong levels on another personality dimension can potentially limit individuals' behaviors. These findings further existing evidence for a profile perspective of personality, while also demonstrating how individual differences variables can uniquely interact with contextual variables.

Several other studies have illustrated the interactive effects of personality traits and job stressors to predict CWB. Sometimes personality traits lead to distinct reactions toward job stressors. For example, narcissism exacerbates the relationships between workplace stressors and deviance, likely because narcissists tend to retaliate when their egos are threatened (Meurs, Fox, Kessler, & Spector, 2013). Grandiose exhibitionism, a facet of narcissism, has been found to moderate relationships between interpersonal conflict and CWB-I, organizational constraints and CWB-O, and organizational constraints and CWB-I. Similarly, trait anger has been shown to strengthen the relationship between workplace stressors, specifically interpersonal conflict and procedural injustice with CWB (Ilie, Penney, Ispas, & Iliescu, 2012).

Sprung and Jex (2012) examined the interactions between work locus of control and work stressors in predicting CWB. They found employees with an external work locus of control (externals) exhibited greater CWB than internals when they experienced organizational constraints or interpersonal conflict. These authors suggest that individuals with an internal work locus of control are more aware of opportunities to actively improve their workplace situations and engage in effective coping mechanisms. Because externals may feel they lack control over work outcomes, CWB presents one of few, albeit ineffective, options to address their situations.

Many of the studies of job stressors and CWB focus on organizational constraints or components of justice. Holtom, Burton, and Crossley (2012) took a rather unique approach to exploring job stressors. Drawing on the unfolding model of turnover, they explored negative work shocks in US corrections department employees. Of particular

interest were the behaviors of employees who chose to remain in the organization instead of quitting after a negative shock. As predicted by the unfolding model, negative shocks led to increased job search behaviors and CWB, and this relationship was explained by decreased job embeddedness. Additionally, in line with other evidence that individuals high in negative affectivity experience negative stimuli more intensely, this mediation effect was moderated by negative affectivity.

Yet another type of work stressor, job insecurity, was recently explored in a sample of casino dealers in Macao, a population particularly familiar with job insecurity (Tian, Zhang, & Zou, 2014). Researchers determined that job insecurity influences CWB through decreased affective commitment. In the midst of such stress, supervisor support was found to be particularly important as it buffered the decreased affective commitment–CWB relationship.

Leaders can influence their followers' CWB in many ways. Kessler, Bruursema, Rodopman, & Spector (2013) examined a model including leadership behaviors, interpersonal conflict, negative emotions, and CWB in a sample of employee–coworker dyads. Results indicated that transformational leadership led to decreased conflict with coworkers and supervisors, which consequently led to fewer negative emotions, leading to decreased CWB (both interpersonal and organizational). On the contrary, passive avoidant leadership increased subordinate negative emotions, leading to increased CWB. Also examining the effects of leadership on CWB, Holtz and Harold (2013) assessed the interaction effects of leadership consideration and structure on CWB. Subordinate ratings indicated the highest levels of CWB among subordinates whose supervisors exhibited high structure and low consideration. These results also demonstrated support for a curvilinear relationship between leadership structure and employee counterproductivity.

Negative emotions are commonly used as mediators in models of CWB prediction. Negative emotions have been found to mediate the relationship between a variety of stressors – including role ambiguity, constraints, workload, and interpersonal conflict – and CWB (Fida, Paciello, Barbaranelli, Tramontano, & Fontaine, 2014). However, not all people experience negative emotions in response to the same stimuli. Role conflict has been empirically linked to CWB via negative emotions only for those high in irritability, and the mediating role of negative emotions in the constraints–CWB relationship is weaker for those high in irritability.

Stressors that lead to CWB can come from many sources, including coworkers, supervisors,

and even customers. Some employees who interact frequently with customers fall victim to customer sexual harassment. In two studies of women who worked in customer service positions, Morganson and Major (2014) found that customers with greater power engaged in more sexual harassment, which took a notable toll on employees, to the extent that symptoms of post-traumatic stress occurred. Results indicate that employees' retaliation against customers buffers the relationship between customer sexual harassment and post-traumatic stress, making retaliation an effective, albeit inadvisable, coping mechanism. Hunter and Penney (2014) explored customer stressors in a sample of restaurant and bar employees. Their findings show that employees were more likely to react to customer stressors with customer-directed CWB than more traditional forms of CWB. They also demonstrated that this particular stress–CWB relationship was mediated by emotional dissonance and emotional exhaustion. Trait anger directly predicted customer stressors, emotional dissonance, emotional exhaustion, and customer-directed CWB.

Emotional exhaustion, whatever the source, has harmful implications for individuals and their employers. Emotional exhaustion has been linked to CWB through multiple mechanisms. Banks, Whelpley, Oh, and Shin (2012) found that emotional exhaustion led to decreased organizational commitment, which resulted in CWB (both interpersonal and organizational). Another study demonstrated mediation of the emotional exhaustion–CWB relationship via depersonalization and disidentification for those individuals with low and moderate levels of trait self-control (Bolton, Harvey, Grawitch, & Barber, 2012). Depersonalization is a passive form of detachment from the organization, whereas disidentification consists of actively contrasting an individual's values with those of the organization. These authors posited, via the conservation of resources and self-control models, that emotional exhaustion resulted in a depletion of resources, which led to psychological withdrawal via depersonalization and disidentification and consequent CWB.

The vast literature exploring relationships between work stressors and CWB (a small sample of which was presented here), primarily assumes a unidirectional causal effect flowing from work stressors to CWB. However, until recently, that assumption has remained untested. Meier and Spector (2013) examined the potential of a reciprocal relationship between work stressors – specifically organizational constraints and experienced incivility – and CWB in a longitudinal study spanning eight months and five assessment points. Results from two- and four-month time lags

demonstrate that organizational constraints predicted subsequent CWB, which predicted subsequent organizational constraints and experienced incivility. At a six-month interval, work stressors did not predict CWB, but CWB continued to predict work stressors. At eight months, organizational constraints predicted subsequent CWB-I only, which predicted both organizational constraints and experienced incivility. These results provide two important insights. First, work stressors and CWB can and do exhibit bidirectional relationships. Second, these relationships change over time and the constructs influence each other more strongly at specific intervals. Therefore, further research into predictors of CWB should not only include time-lapsed designs to better tests models, but researchers should also carefully select time intervals.

Overall, a wealth of evidence now exists to document the importance of person–situation interactions in stimulating CWB. Whereas one of the greatest benefits of this literature is the inclusion of a diverse set of constructs and perspectives, the value of these studies is currently limited by their lack of integration. Each of these studies has contributed a piece to the puzzle that is understanding and eventually avoiding and reducing CWB. However, future work should seek to integrate these findings to provide actionable recommendations to organizations that are supported by large-scale and replicable evidence.

Physical stressors

In addition to the many psychological stressors that employees encounter, physical states can also cause stress and thereby influence work behaviors. Recently, scholars have applied insights from the occupational health field to explain the effects of physical stressors on employee CWB and unethical behavior. In addition to other state predictors, such as emotions, physical stressors can help explain why good employees – including those who have been selected based on desirable traits – might still engage in CWB. Therefore, research into the effects of these stressors, while early in its development, holds great potential as organizations try to reduce workforce counterproductivity.

Sources of strain such as sleep loss, daily demands, and posture have been investigated as potential antecedents of undesirable work behaviors. Several of these studies have been grounded in the Ego Depletion model, which regards self-control as a finite resource that is depleted by self-regulatory behaviors on a daily basis and replenished via rest (cf., Baumeister, Bratslavsky, Muraven, & Tice, 1998). According to this model,

without sufficient rest, employees' depleted self-control resources will not be restored; affected employees will consequently lack the self-regulatory capacity necessary to avoid misconduct. Guided by this theoretical framework, Barnes and Wagner (2009) conducted a groundbreaking, large-scale study on the work outcomes of sleep deprivation. They analyzed data from the National Institute for Occupational Safety and Health as well as the Bureau of Labor Statistics to determine the detrimental effects of sleep deprivation following the switch to Daylight Saving Time, when one night-time hour is lost. The phase advance led to systematically reduced sleep duration and more frequent and severe workplace injuries.

Subsequent investigations of the negative relationship between sleep quantity and unethical behavior as mediated by self-control resources further contributed important insights (Barnes, Schaubroeck, Huth, & Ghumman, 2011). Christian and Ellis (2011) extended these investigations to assess the effects of sleep deprivation on a broad set of CWB. Across both laboratory and field settings, their findings supported the sleep deprivation–CWB relationship as well as mediation by self-control and state hostility. Since these initial discoveries, the negative effects of poor sleep have been linked to various costly workplace behaviors including cyberloafing (Wagner et al., 2012), displays of prejudice (Ghumman & Barnes, 2013), and abusive supervision (Barnes, Lucianetti, Bhawe, & Christian, 2014).

Also guided by the premises of self-regulation, Kouchaki and Smith (2013) suggested that as employees' self-control resources are tapped throughout a typical day, their ability to self-regulate diminishes even within the course of one workday. They posit a 'morning morality effect', in which people behave more ethically in the morning compared with the afternoon, when self-control resources are more depleted. Their results empirically demonstrated that people engage in more unethical behavior later in the day, with the effect exacerbated for people with a lower propensity to morally disengage. Compared to those low on moral disengagement, people with a high propensity to morally disengage are less likely to attempt impulse control. Therefore, they rely less on self-regulatory processes and their behaviors are influenced less by depletion of their self-control resources.

Sleep loss is not the only physical stressor that influences negative workplace behaviors. A recent study examined the effects of an overlooked aspect of the work experience: employee posture. Across four distinct lab and field studies, researchers found that individuals are more likely to engage in dishonest behavior when they occupy

more expansive (rather than contractive) postures (Yap, Wazlawek, Lucas, Cuddy, & Carney, 2013). Interestingly, this effect was established regardless of whether individuals were conscious of their posture; even when the expansive postures were incidentally imposed by the environment, individuals displayed patterns of unethical behavior. After occupying more expansive postures, individuals experienced feelings of power and consequently engaged in unethical and dishonest behavior.

Beyond contributing to our overall understanding of the dynamic nature of CWB and its nomological network, these studies on physical stressors have significant implications for future research and practice. Ghumman and Barnes (2013) note the importance of identifying mechanisms to replenish self-regulatory resources to diminish undesirable behaviors. They call for research into potential interventions such as naps, glucose intake, or even creating additional opportunities to experience positive affect. Research on comfort and posture can also guide future practice, especially when results indicate that incidentally imposed postures influence behavior. Organizations can use such evidence in structuring workplaces. While researchers have considered various aspects of proxemics and privacy, most notably open versus closed office plans, the physical consequences of these designs should be examined as thoroughly as psychological outcomes have been examined in the past.

Overall, recent research has demonstrated the importance of physical stressors on employee work behaviors. Interventions to boost employees' psychological resources or modify their physical workspaces have great potential to impact CWB in applied settings. However, several noteworthy practical problems relating to implementation still require examinations and solutions.

Stressors and strain and CWB constructs: A meta-analytic review of findings

Job and interpersonal stressors exhibited quite varied relationships with overall CWB and withdrawal-related constructs (see Table 6.9). General stressors are only modestly correlated with overall CWB, turnover, and withdrawal behaviors (ρ s = .12, .17, and .16, respectively), but demonstrate substantially larger relationships with turnover intentions (ρ = .41). Conflict within organizations very strongly relates to overall CWB (mean ρ = .47) and moderately to withdrawal (ρ = .30). Although the strong relationship between interpersonal conflict at work and interpersonal CWB (ρ = .50) is unsurprising, this antecedent's similar relationship with

Table 6.9 Relations among stress and strain variables and CWB: Summary from meta-analyses

Measure	N	k	r _{obs}	SD _r	ρ	SD _ρ	90% CI	
Stressors								
Stressors								
CWB Overall ^g	88,839	101			.12		.11	−.06, .30
Turnover Intentions ^d	22,745	76	.30		.41		.24	.02, .80
Turnover ^d	4,303	13	.13		.17		.15	−.08, .42
Withdrawal ^d	7,355	27	.13		.16		.15	−.09, .41
Work Pressure								
Accidents/Injuries ^h	21,109	15	.06		.07		.12	−.13, .27
Conflict								
CWB Overall ^a	2,029	4	.41		.54		.02	.51, .57
CWB Overall ^{b,1,2,3}	934	7	.31		.38		.05	.30, .46
CWB Overall ^{b,1,2}	1,609	12	.39		.48		.15	.23, .73
Withdrawal ^a	2,029	4	.23		.30		.13	.09, .51
Conflict – Interpersonal								
CWB-Organizational ^e	1,100	5	.33		.41			
CWB-Interpersonal ^e	1,654	7	.40		.50			
Conflict – Family to Work								
Withdrawal ^c	1,561	6	.18	.07	.20		.02	.16, .24
Conflict – Work to Family								
Withdrawal ^c	1,561	6	.18	.07	.20		.03	.14, .26
Challenge Stressors								
Turnover Intentions ^d	4,907	14	.09		.11		.11	−.07, .29
Turnover ^d	1,465	3	.04		.04		.02	.01, .07
Withdrawal ^d	2,730	10	.06		.07		.14	−.16, .30
Hindrance Stressors								
Turnover Intentions ^d	17,838	62	.36		.49		.21	.14, .84
Turnover ^d	2,838	10	.18		.23		.15	−.02, .48
Withdrawal ^d	4,625	17	.17		.22		.13	.01, .43
Role Clarity								
Turnover ^f	795	5	−.18		−.24			
Role Conflict								
Turnover ^f	780	5	.17		.22			

(Continued)

Table 6.9 Relations among stress and strain variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Role Overload							
Turnover ^f	3,419	5	.09		.12		
Lack of Personal Accomplishments							
Absenteeism ⁱ	1,970	11	.11		.17		.04, .29
Strain							
Stress							
CWB Overall ^a	1,785	3	.28		.34		.07, .22, .46
Turnover ^f	1,716	8	.13		.16		
Withdrawal ^a	1,785	3	.23		.28		.10, .12, .44
Stress – Psychological							
Absenteeism (Frequency) ^k	1,068	3	.11	.01	.18		
Absenteeism (Time Lost) ^k	358	4	.18	.07	.32		
Acute Stress/Illness							
Absenteeism ⁱ	13,993	6	.06		.09		-.06, .23
Illness – Varied							
Absenteeism ⁱ	27,535	19	.11		.17		-.09, .44
Illness – Physical							
Absenteeism ⁱ	50,632	65	.14		.22		-.01, .45
Absenteeism (Frequency) ⁱ	18,570	24	.15		.23		-.01, .46
Absenteeism (Time Lost) ⁱ	31,929	40	.14		.22		-.01, .45
Physical – Composite							
Absenteeism ⁱ	25,795	49	.17		.25		.12, .39
Illness – Psychology							
Absenteeism ⁱ	66,679	128	.13		.20		.04, .36
Absenteeism (Frequency) ⁱ	16,319	37	.14		.22		.00, .44
Absenteeism (Time Lost) ⁱ	46,890	86	.12		.19		.06, .32
Illness – Psychosomatic							
Absenteeism ⁱ	9,601	20	.21		.31		.06, .56
Psychological Well-Being							
Withdrawal ^{l,4}	630	2	-.12	.14			
Burnout							
CWB Overall ^g	8,010	31			.29		.19, -.02, .60
Absenteeism ⁱ	1,277	6	.25		.38		

Table 6.9 Relations among stress and strain variables and CWB: Summary from meta-analyses (continued)

Measure	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	90% <i>CI</i>
Anxiety							
Absenteeism ⁱ	452	3	.06		.10		-.08, .26
Depersonalization							
Absenteeism ⁱ	1,970	11	.08		.12		-.07, .30
Emotional Exhaustion							
Absenteeism ⁱ	11,080	24	.12		.18		-.02, .38
Depression							
Absenteeism ⁱ	20,437	13	.13		.20		
Fatigue							
Absenteeism ⁱ	1,063	3	.32		.49		.12, .86
Dissatisfaction-Related Symptoms							
Absenteeism ⁱ	3,479	7	-.04	.06	-.03		-.16, .10
Lateness ^j	418	3	.09	.07	.09		-.03, .21
Alcohol Abuse ^j	4,799	3	.03	.07	.01		-.11, .13
Job Risk – Perceived							
Accidents/Injuries ^h	5,693	15	.15		.18		-.07, .43
Work Strain							
Absenteeism ⁱ	18,630	56	.09		.15		-.08, .37
Absenteeism (Frequency) ⁱ	3,373	14	.11		.17		-.15, .48
Absenteeism (Time Lost) ⁱ	14,743	40	.09		.14		-.05, .33

Note. *N* = total sample size; *k* = number of effect sizes; *r_{obs}* = mean, sample size-weighted correlation; *SD_r* = standard deviation of *r*; *ρ* = meta-analytic correlation – see numerical superscripts for details on criterion measurement and corrections applied; *SD_ρ* = standard deviation of *ρ*; *CI* = credibility interval. Values for *CI* were computed when sources did not originally report them but provided *ρ* and *SD_ρ*. Data bars for *ρ* are scaled from .00 to 1.00 and reference absolute values; gray bars indicate negative and black bars indicate positive mean effects. Data sources: ^a Carpenter & Berry (2014); ^b Berry, Carpenter, & Barratt (2012); ^c Mesmer-Magnus & Viswesvaran (2005); ^d Podsakoff, LePine, & LePine (2007); ^e Hershcovis et al. (2007); ^f Griffeth, Hom, & Gaertner (2000); ^g Taylor (2012); ^h Christian et al. (2009); ⁱ Darr & Johns (2008); ^j Lau, Au, & Ho (2003); ^k Farrell & Stamm (1988); ^l Carr et al. (2003). ¹ other-rated; ² corrected for indirect range restriction; ³ without same-source samples; ⁴ not corrected for measurement error.

organizational CWB (*ρ* = .41) is intriguing. These findings suggest that employees may engage in CWB in the face of conflict for reasons other than purely retaliating toward other individuals. High prevalence of conflict at work may also reflect a norm of counterproductivity.

Role conflict between work and nonwork domains has only been examined in relation to withdrawal; withdrawal relates equally to work–family conflict in both directions (i.e., work to family and family to work; *ρ* = .20 for each). Findings for challenge stressors indicate almost negligible relationships

with turnover, turnover intentions, and withdrawal (*ps* range from .04 to .11). On the contrary, hindrance stressors relate strongly to turnover intentions (*ρ* = .49) and moderately to actual turnover and withdrawal (*ρ* = .23 and .22, respectively). Characteristics of one's roles, such as role clarity, role conflict, and role overload, have only been examined with respect to actual turnover (*ps* = -.24, .22, and .12, respectively).

The relationships between a broad variety of strain conceptualizations and CWB have been meta-analytically examined, but an overwhelming

number of the described relationships center on the influence of stressors and strain on absenteeism. Overall measures of stress are about equally related to overall CWB and withdrawal (ρ s = .34 and .28, respectively) and modestly related to actual turnover (ρ = .16). General work strain relates to absenteeism at a magnitude comparable to the overall stress–turnover link (ρ = .15). Differences between frequency and time lost measures of absenteeism with the work strain relationship are due to second-order sampling error. Intuitively, illnesses, both physical and psychological, are modestly related to absenteeism measures of frequency and time lost (ρ s range from .19 to .23). Absenteeism not only reflects counterproductive behaviors but is also subject to external influences not fully under the employee's control. Experienced burnout shows substantive relations with overall CWB (ρ = .29) and even stronger links with absenteeism (ρ = .38). However, the constituent elements of burnout, depersonalization and emotional exhaustion, exhibit weaker correlations with absenteeism (ρ = .12 and .18, respectively). Depression has similar relations with absenteeism (ρ = .20).

Organizational constraints

Organizational constraints are posited as a unifying framework for a variety of situational and organizational factors serving to inhibit the completion of an individual's work tasks and/or goals (O'Connor et al., 1984; Peters & O'Connor, 1980). Meta-analytic relationships between CWB constructs and organizational constraints are summarized in Table 6.10. Organizational constraints relate moderately to strongly to CWB criteria. Across eight meta-analyses of organizational constraints, the average unit-weighted ρ for overall CWB is .36. Fewer meta-analyses have examined the relationship with organizational and interpersonal CWB or narrower facets of CWB. Comparable to the effect with overall CWB, the average ρ for organizational CWB is around .32, whereas subdimensions of organizational CWB, such as production deviance, demonstrate somewhat stronger relationships (ρ = .44) with organizational constraints. Organizational constraints influence interpersonal CWB (ρ = .36) at a similar level as overall CWB and organizational CWB; again, narrower forms of interpersonal CWB, such as interpersonal aggression, demonstrate a stronger relationship with organizational constraints (ρ = .45). Organizational constraints demonstrate similar magnitudes of effects with a variety of withdrawal constructs (ρ s from .23 to .42), and a strong relationship with withdrawal behaviors (mean ρ across two meta-analyses = .40).

Organizational culture, climate, and other characteristics

The distinctions between organizational culture and climate is notoriously difficult with an often-blurred boundary demarcating where one begins and the other ends. We shall henceforth denote organizational climate as shared perceptions regarding either general or specified sets of procedures or policies (Carr, Schmidt, Kevin, & DeShon, 2003). Culture implies embedded and long-standing beliefs and norms as opposed to potentially more transient climate perceptions (Schein, 2010). Three broad categories of culture and climate have received the majority of attention in terms of their relationships with CWB: organizational climate, ethical culture and climate, and safety climate and systems. Meta-analytic results are also summarized in Table 6.10.

Ostroff (1993) provided a guiding hierarchy wherein organizational climate is inclusive of affective, cognitive, and instrumental facets. Affective climate refers to social interactions and encompasses participation in establishing practices, cooperation and support, and social rewards such as praise or formal recognition. Cognitive climate refers to psychological involvement and development relating to innovation and autonomy. Instrumental climate emphasizes work processes such as structured environments, extrinsic reward systems, and an organizational hierarchy. Organizational climate has only been linked with withdrawal-related CWB. Cognitive organizational climate perceptions are unrelated to withdrawal, whereas affective and instrumental climate perceptions are negatively correlated with withdrawal (r s = .28 and .33, respectively).

Ethical culture strongly influences unethical behavior (ρ = -.52). Different forms of ethical climate relate differentially to unethical behavior. Egoistic ethical climate appears to be positively related to unethical behavior (ρ = .22) whereas principled and benevolent ethical climate are negatively correlated with unethical behavior (ρ s = -.44 and -.40, respectively). Given these promising and sizable relationships, albeit from small meta-analyses (k s of 4 to 6), future research would benefit from exploring how different forms of ethical climate relate to other forms of CWB. The only meta-analytic evidence to date relies purely on unethical behavior with no variety in manifestations in CWB.

Straying from the Ostroff (1993) taxonomy, safety climate is a focused percept regarding policies and practices inextricably related to matters of safety (Christian, Bradley, Wallace, & Burke, 2009). Unsurprisingly, safety climate is negatively related to unsafe behavior and accidents and injuries on the job (ρ s = -.49 and -.14, respectively). However, results differ based on the level of analysis for safety climate perceptions (individual, group,

Table 6.10 Relations among organizational variables and CWB: Summary from meta-analyses

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Organizational Constraints							
CWB Overall ^a	8,428	24	.34		.39	■	.12, .59
CWB Overall ^b	2,182	5	.42		.52	■	.27, .77
CWB Overall ^{c,1}	9,394	23	.38	.13	.43	■	
CWB Overall ^{c,2}	1,475	10	.26	.14	.29	■	
CWB Overall ^{a,1}	8,428				.39	■	
CWB Overall ^{a,2}	856				.29	■	
CWB Overall ^{d,2,3}	838	6	.20		.22	■	.04, .29
CWB Overall ^{d,2}	1,262	9	.27		.31	■	.11, .51
CWB-Organizational ^a	3,954	9	.33		.38	■	.22, .54
CWB-Organizational ^{c,1}	6,406	11	.37	.15	.42	■	
CWB-Organizational ^{c,2}	1,037	6	.16	.18	.18	■	
CWB-Organizational ^e	2,734	10	.26		.30	■	
CWB-Interpersonal ^e	1,974	8	.31		.36	■	
CWB-Interpersonal ^a	3,954	9	.40		.45	■	.21, .80
CWB-Interpersonal ^{c,1}	6,406	11	.36	.14	.41	■	
CWB-Interpersonal ^{c,2}	1,037	6	.20	.13	.23	■	
Interpersonal Aggression ^{c,1}	3,570	8	.41	.13	.45	■	
Production Deviance ^{c,1}	2,294	5	.36	.13	.44	■	
Sabotage ^{c,1}	2,854	7	.30	.16	.38	■	
Absenteeism ^{c,1}	1,355	4	.22	.11	.27	■	
Turnover Intentions ^{c,1}	11,138	41	.32	.11	.39	■	
Turnover Intentions ^{c,2}	931	6	.18	.10	.23	■	
Withdrawal ^b	2,182	5	.34		.42	■	.19, .73
Withdrawal ^{c,1}	2,900	7	.32	.16	.38	■	
Culture and Climate							
Organizational Climate – Affective Perceptions							
Withdrawal ^g	1,957	7	-.28	.14			
Organizational Climate – Cognitive Perceptions							
Withdrawal ^g	884	3	-.07	.03			

(Continued)

Table 6.10 Relations among organizational variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Organizational Climate – Instrumental Perceptions							
Withdrawal ^g	1,762	6	-.33	.19			
Ethical Culture							
Unethical Behavior ^f	1,216	6	-.44		-.52		.12 -.72, -.32
Ethical Climate – Egoistic							
Unethical Behavior ^f	775	5	.17	.13	.22		
Ethical Climate – Principled							
Unethical Behavior ^f	775	5	-.37	.00	-.44		
Ethical Climate – Benevolent							
Unethical Behavior ^f	542	4	-.34	.00	-.40		
Safety Climate Perceptions							
Accidents ⁱ	27,639	27	-.11		-.14		
Unsafe Behavior ⁱ	15,327	31	-.39		-.49		
Safety Climate – Psychological							
Accidents/Injuries ^{h,4}	1,920	4	-.16	.09	-.20		.03 -.25, -.15
Accidents/Injuries ^{h,1}	25,768	24	-.10	.06	-.13		.01 -.15, -.11
Accidents/Injuries ^h	27,639	27	-.11	.07	-.14		.02 -.17, -.11
Safety Climate – Group Level							
Accidents/Injuries ^{h,4}	360	11	-.37	.14	-.42		.05 -.50, -.34
Accidents/Injuries ^h	421	13	-.34	.14	-.39		.05 -.47, -.31
Accidents/Injuries ^{h,1}	63	2	-.19	.14	-.21		.12 -.41, -.01
Safety Climate – Organizational Level							
Accidents/Injuries ^h	190	6	-.34		-.39		.05 -.47, -.31
Safety Systems Perceptions							
Accidents/Injuries ^h	17,439	6	-.12		-.16		.03 -.21, -.11
Safety Systems – Group Level							
Accidents/Injuries ^h	219	3	-.34		-.38		.10 -.54, -.22
Policy							
Code of Conduct – Existence							
Unethical Behavior ^f	8,897	13	-.03		-.04		.08 -.18, .10
Code of Conduct – Enforcement							
Unethical Behavior ^f	5,804	5	-.34		-.48		.04 -.55, -.41
Control Policy							
Absenteeism (Time Lost) ^j	1,313	12	-.30	.01	-.46		

Table 6.10 Relations among organizational variables and CWB: Summary from meta-analyses (continued)

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Norms							
Absenteeism Norm – Perceptions							
Absenteeism ^k	392	2	.17	.01	.26		.01 .24, .28
CWB Norms							
CWB Overall ^l	21,756	71			.33		
Support							
CWB Overall ^b	750	3	-.25		-.30		.06 -.40, -.20
CWB Overall ^l	20,067	60			-.14		.12 -.34, .06
CWB Overall ^m	616	3			-.13		
Withdrawal ^b	750	3	-.41		-.49		.06 -.59, -.39
Supervisor Support							
Accidents/Injuries ^h	4,615	12	-.12		-.15		.07 -.27, -.03
Supervisor Support – Group Level							
Accidents/Injuries ^h	129	3	-.21		-.24		.03 -.29, -.19
Misc.							
Work Group Cohesion							
Turnover ⁿ	4,558	9	-.09		-.13		
Work Group Pressure							
Accidents/Injuries ^h	103	3	-.27		.33		.05 .25, .41
Internal Group Processes around Safety							
Accidents/Injuries ^h	2,839	8	-.16		-.19		.07 -.31, -.07
Management Commitment to Safety							
Accidents/Injuries ^h	80	3	-.33		-.36		.00 -.36, -.36
Management Commitment to Safety – Group Level							
Accidents/Injuries ^h	3,222	7	-.17		-.21		.04 -.28, -.14
Social Support							
Withdrawal Intentions ^p	8,700	5	-.04	.02	-.05		.00 -.05, -.05
Organizational Politics							
CWB Overall ^o	12,462	34			.50		.21 .15, .85
Absenteeism ^o	2,990	9			.42		.27 -.02, .86
Turnover Intentions ^o	1,763	6			.11		.44 -.61, .83
Trust in Organization							
CWB Overall ^m	232	2			-.25		
HRM Practices for Safety							
Accidents/Injuries ^h	3,657	5	-.15		-.19		.03 -.24, -.14

(Continued)

Table 6.10 Relations among organizational variables and CWB: Summary from meta-analyses (continued)

Measure	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	ρ	<i>SD_ρ</i>	90% CI
HRM Practices for Safety – Group Level							
Accidents/Injuries ^h	129	3	-.44		-.46	.06	-.56, -.36

Note. *N* = total sample size; *k* = number of effect sizes; *r_{obs}* = mean, sample size-weighted correlation; *SD_r* = standard deviation of *r*; ρ = meta-analytic correlation – see numerical superscripts for details on criterion measurement and corrections applied; *SD_ρ* = standard deviation of ρ ; CI = credibility interval. Values for CI were computed when sources did not originally report them but provided ρ and *SD_ρ*. Data bars for ρ are scaled from .00 to 1.00 and reference absolute values; gray bars indicate negative and black bars indicate positive mean effects. Data sources: ^a Chang (2015); ^b Carpenter & Berry (2014); ^c Pindek & Spector (2016); ^d Berry, Carpenter, & Barratt (2012); ^e Hershcovis et al. (2007); ^f Kish-Gephart, Harrison, & Treviño (2010); ^g Carr et al. (2003); ^h Christian et al. (2009); ⁱ Beus, Dhanani, & McCord (2015); ^j Farrell & Stamm (1988); ^k Lau, Au, & Ho (2003); ^l Taylor (2012); ^m Colquitt et al. (2013); ⁿ Griffeth, Hom, & Gaertner (2000); ^o Bedi & Schat (2013); ^p Viswesvaran, Sanchez, & Fisher (1999). ¹ self-report; ² other-report; ³ without same-source samples; ⁴ medical records/osha; ⁵ non-shift work = 0, shift work = 1; ⁶ day shift = 0, other = 1.

organizational). Individual (psychological) safety climate perceptions are modestly related to accidents and injuries (mean $\rho = -.16$). Yet, group-level safety climate perceptions relate, on average, substantially negatively to accidents and injuries (average $\rho = -.34$). Organizational-level safety climate perceptions relate similarly to accidents and injuries ($\rho = -.39$). Safety systems are a subset of overall safety climate, which are the perceptions related to policies and procedures intended to increase safety, such as managing hazards and investigating accidents (Christian et al., 2009). Individual perceptions of safety systems relate modestly to accidents and injuries ($\rho = -.16$) whereas safety system evaluations at the group level relate strongly to accidents and injuries ($\rho = -.38$).

Organizational policies and codes of conduct appear to hold an important influence on CWB, if they are enforced. Although the existence of codes of conduct exhibits a null effect with unethical behavior ($\rho = -.04$), enforcement of such codes of conduct has a strong effect on unethical behavior ($\rho = -.48$). Similarly, control policies around absenteeism relate powerfully to time lost measures of absenteeism ($\rho = -.46$).

Ultimately, policies and culture and climate variables are likely to influence CWB through setting and enforcing norms in organizations. Providing support for this assumption, meta-analyses have found that absenteeism-related norm perceptions relate moderately to absenteeism ($\rho = .26$) and norms of CWB relate moderately strongly to overall CWB ($\rho = .33$). An interesting question revolves around the degree to which perceptions of organizational climate and culture as well as policies reflects individuals' justifications of their own CWB versus idiosyncratic or stochastic inaccuracies (e.g., unreliability) that may be introduced and cloud accurate perceptions of reality.

Group- and organization-related variables can also influence CWB. For example, work group cohesion is weakly negatively correlated with turnover ($\rho = -.13$), work group pressure is moderately strongly related to accidents and injuries ($\rho = .33$), and management commitment to safety is substantially correlated with accidents and injuries ($\rho_s = -.36$ and $-.21$ at the individual and group levels of perceptions, respectively). Differences in correlations may be due to the small number of studies meta-analyzed for these relationships. Human resource management safety practices correlate $-.19$ with accidents and injuries at the individual level and $-.46$ at the group level.

The reader should be struck by the limited number of organizational variables examined in conjunction with CWB. Of the few variables examined, an even smaller set has been investigated in terms of relationships with subdimensions of CWB. A number of theoretically interesting and practically important questions merit inquiry. For example, how does social support relate to interpersonal CWB; trust in the organization to theft; and HRM practices vis-à-vis sexual harassment to aggression against vulnerable employees? This particular dearth of attention is quite shocking, because the intersection of organizational variables and CWB presents countless opportunities to develop fruitful research agendas that in turn can inform IWO psychology practice.

Job characteristics

Although position-specific characteristics might more proximally relate to CWB than organizational ones, few primary studies have examined relationships between job characteristics and CWB. What has been established is a modest relationship between job characteristics and withdrawal-related CWB (see Table 6.11). Of particular note are the

Table 6.11 Relations among job characteristics and CWB: Summary from meta-analyses

<i>Measure</i>	<i>N</i>	<i>k</i>	<i>r_{obs}</i>	<i>SD_r</i>	<i>ρ</i>	<i>SD_ρ</i>	<i>90% CI</i>
Job Characteristics							
Feedback							
Absenteeism (Frequency) ^a	478	2	-.01	.01	-.03		
Absenteeism (Time Lost) ^a	1,061	4	.06	.01	-.10		
Task Autonomy							
Absenteeism (Frequency) ^a	3,813	7	-.11	.00	-.18		
Absenteeism (Time Lost) ^a	3,433	6	-.07	.01	-.13		
Task Identity							
Absenteeism (Frequency) ^a	1,047	3	-.02	.03	-.03		
Absenteeism (Time Lost) ^a	920	3	-.14	.00	-.24		
Task Significance							
Absenteeism (Frequency) ^a	611	2	-.17	.00	-.27		
Absenteeism (Time Lost) ^a	1,207	4	.03	.02	.05		
Task Variety							
Absenteeism (Frequency) ^a	881	3	-.04	.00	-.06		
Absenteeism (Time Lost) ^a	1,051	4	-.08	.01	-.13		
Instrumental Communication							
Turnover ^b	5,185	8	-.11		-.14		
Routinization							
Turnover ^b	3,707	6	.08		.11		
Job Scope							
Turnover ^b	4,285	15	-.11		-.14		
Job Security							
CWB Overall ^d	9,884	20			-.01	.19	-.32, .30
Absenteeism ^e	1,874	2	.01	.04	.03	.03	-.02, .08
Turnover Intention ^f	11,247	26	-.23		-.28	.08	-.42, -.15
Accidents/Injuries ^c	118	3	.12		.13	.00	.13, .13
Alcohol Abuse ^e	2,479	2	.06	.00	.06	.00	.06, .06
Shift Work							
Absenteeism ^{e,2}	1,324	3	-.14	.29	.01	.19	-.30, .32
Absenteeism (Frequency) ^{a,1}	5,006	6	.10	.03	.15		
Absenteeism (Time Lost) ^{a,1}	6,807	10	.08	.01	.12		
4-Day Work Week							
Absenteeism ^e	1,083	2	.26	.34	.33	.34	-.23, .89

(Continued)

Table 6.11 Relations among job characteristics and CWB: Summary from meta-analyses (continued)

Measure	<i>N</i>	<i>k</i>	<i>r</i> _{obs}	<i>SD</i> _{<i>r</i>}	ρ	<i>SD</i> _{ρ}	90% CI
Misc.							
Alternative Job Opportunities							
Turnover ^b	18,189	23	.11		.15		
Comparison of Alternatives with Present Job							
Turnover ^b	826	6	.14		.19		
Realistic Job Preview							
Turnover ^a	12,344	39	-.05				
Turnover (Voluntary) ^a	3,230	17	-.06				

Note. *N* = total sample size; *k* = number of effect sizes; *r*_{obs} = mean, sample size-weighted correlation; *SD*_{*r*} = standard deviation of *r*; ρ = meta-analytic correlation – see numerical superscripts for details on criterion measurement and corrections applied; *SD* _{ρ} = standard deviation of ρ ; CI = credibility interval. Values for CI were computed when sources did not originally report them but provided ρ and *SD* _{ρ} . Data bars for ρ are scaled from .00 to 1.00 and reference absolute values; gray bars indicate negative and black bars indicate positive mean effects. Data sources: ^a Farrell & Stamm (1988); ^b Griffeth, Hom, & Gaertner (2000); ^c Christian et al. (2009); ^d Taylor (2012); ^e Lau, Au, & Ho (2003); ^f Sverke, Hellgren, & Näswall (2002); ^g Phillips (1998). ¹ day shift = 0, other = 1; ² non-shift work = 0, shift work = 1.

relationships of absenteeism with task autonomy, task identity, task significance, and task variety (mean $\rho = -.12$). Both job scope and instrumental communications demonstrate small negative correlations with turnover ($\rho = -.14$, respectively). Job security is unrelated ($\rho = -.01$) to overall CWB, whereas it moderately relates to turnover intentions ($\rho = -.28$). Unsurprisingly, alternative job opportunities and comparisons of alternatives with one's present job are positively correlated with turnover ($\rho = .15$ and $.19$, respectively). The job characteristics model is pervasive throughout the scholarly literature, yet its lack of integration in the CWB domain is glaring and disappointing. Conceptually, satisfaction with work itself and the characteristics that comprise work are likely to influence one's proclivity to engage in CWB. For example, individuals working in jobs with little task autonomy, task significance, or task variety may engage in counterproductivity to ameliorate their boredom and/or frustration. Job design might thereby prove an effective intervention for managing CWB.

A few studies have examined how shift work influences absenteeism rates; meta-analyses have documented that it is associated with higher frequency of absenteeism as well as time lost from absenteeism ($\rho = .15$ and $.12$, respectively). However, there is the possibility that this effect might be attributed to occupational differences rather than pure shift work effects (e.g., blue collar, lower complexity jobs are more likely to have shift work). Even though a meta-analysis has examined the effects of a 4-day work week, the database was limited to only two primary studies. Therefore, no

robust conclusions can be drawn. As jobs and their characteristics evolve, research should be directed at the effects of contemporary work arrangements and job characteristics on CWB (e.g., CWB of contingent workers, intraindividual differences in CWB when telecommuting versus working from organizational locations).

CONCLUSION

Throughout this chapter, we sought to accomplish two core objectives. First, in narrative and in an unprecedented tabular form, we presented the current state of IWO psychology research in the form of meta-analytic findings on the nomological network of CWB. Second, through highlighting emerging CWB research (e.g., group-level CWB, cyber-CWB) and discussing recent, notable studies within this domain, we set out to identify literature gaps that suggest fruitful avenues for impactful future research and empirically guided applied interventions.

As we attended to those primary objectives, several key observations emerged. First, the scholarly literature dedicated to CWB is extensive and well-established within our field. Substantial investigation into the conceptualization of work counterproductivity has been conducted and valid measures have been rigorously developed to assess it. However, despite this impressive foundation, there has also been a proliferation of measures and construct labels without the required evidence for

convergent or discriminant validity. Researchers should carefully select measures based on considerations of validity evidence and research objectives. For example, if the goal is to investigate retaliatory behaviors, assessment of motivation is just as necessary as assessment of behaviors. The literature in IWO psychology in general and on CWB in particular is rich with relationships that merit further exploration.

Second, integration of scholarly work from different disciplines is necessary to optimally understand and influence CWB, yet well-established bodies of research outside IWO psychology and management have often been neglected. Counternormative behaviors (e.g., theft, dishonesty, harassment) do not solely occur in the context of work, and it would be foolish to neglect the bountiful literature found in related fields. As briefly relayed throughout this chapter, other domains of psychology, criminology, and communications represent just a few examples that can contribute meaningfully to CWB research. Especially as new CWB constructs are introduced, optimal assessment and conceptualization will need to take theoretical frameworks and empirical evidence from beyond IWO psychology into account.

Third, several narrow CWB criteria have been empirically established (e.g., theft, sabotage, withdrawal) but largely neglected. The majority of investigations into antecedents of CWB do not assess relationships with narrower constructs. As evidenced from the Berry et al. (2007) meta-analysis, interpersonal and organizational CWB have noticeably different relationships with personality, yet the literature relating the Big Five to sabotage and production deviance is near nonexistent. As this research domain evolves to focus more on the mechanisms underlying many well-established predictor–criterion relationships, narrower CWB criteria may prove more important than ever before. Although individuals are likely to be predisposed to engage in counterproductivity based on stable personality characteristics (e.g., low integrity or self-control), it is also likely that different motivations will lead to different types of CWB. For example, while some stressors might result in CWB via anger, some perceptions relating to justice or equity (e.g., pay) may result in withdrawal instead. To date, such differential patterns have only been limitedly observed.

The field of IWO psychology has made great strides in explaining individual differences in core job performance as a function of both individual differences and contextual variables (see Chapters 9, 12, and 13 on cognitive ability and personality in this volume). By exploring these and new, yet unexplored predictors and their interactions

on a multifaceted performance domain, the CWB literature is positioned to make equally important contributions in the future.

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Adaptive Performance

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INTRODUCTION

One of the major endeavors in industrial, work, and organizational psychology has been to understand and predict individual job performance (Viswesvaran, 2001). Traditional models of job performance focused on individuals' task and interpersonal behaviors in a static environment. Complementing traditional models of job performance, research on adaptive performance (AP) emphasizes individuals' responses to changing work environments. Recent developments on AP research have warranted an in-depth review of the literature.

We begin this chapter with a brief historical background of the AP literature and discuss the primary conceptualizations of AP. Our critical review of the literature, organized by two dominant research paradigms, focuses on key studies that advance understanding of AP. After the review, we highlight the connection between the AP literature and several other bodies of literature, and end the chapter with directions for future research.

HISTORICAL REVIEW AND PRIMARY CONCEPTUALIZATIONS

A Brief Historical Review

Around the turn of the century, researchers (Allworth & Hesketh, 1999; Pulakos, Arad, Donovan, & Plamondon, 2000) began to append the static models of job performance with AP. They argued that job demands had become increasingly dynamic due to technological innovations, merger and acquisitions, and globalization, and as a result, workers had to deal with frequent changes and transitions in their task environment. AP, capturing individuals' 'responsiveness to changing job requirements', serves a distinct contrast to task performance, which pertains to 'day-to-day performance on specific job tasks' (Allworth & Hesketh, 1999, p. 98).

Recognizing that different types of changes might require different adjustments to knowledge, skills, and strategies, Pulakos et al. (2000) provided insight into the AP requirements of jobs. Through the use of critical incidents, Pulakos et al.

(2000) developed an eight-dimensional taxonomy of AP applicable to a wide range of jobs: (a) handling emergencies or crisis situations; (b) handling work stress; (c) solving problems creatively; (d) dealing with uncertain and unpredictable work situations; (e) learning work tasks, technologies, and procedures; (f) demonstrating interpersonal adaptability; (g) demonstrating cultural adaptability; and (h) demonstrating physically oriented adaptability. Pulakos et al.'s (2000) work spurred AP research using the performance evaluation paradigm, which we describe below.

Meanwhile, in the training and development literature, scholars (e.g., Smith, Ford, & Kozlowski, 1997) began to assess and predict adaptive transfer, i.e., the extent to which trainees can adapt newly acquired knowledge and skills to a task or task context that is quite different from stimulus materials in the training context (Schmidt & Bjork, 1992). Notably, Ford, Smith, Weissbein, Gully, and Salas (1998) identified motivational traits and learning strategies that facilitate learning and eventual adaptive transfer performance, whereas Kozlowski, Gully, Brown, Salas, Smith, and Nason (2001) designed and evaluated a motivational intervention that influenced adaptive transfer performance. Closely related to the adaptive transfer studies, researchers (e.g., LePine, Colquitt, & Erez, 2000) started to study AP using the task change paradigm by assessing individual performance in reaction to an unforeseen change in a well-learned task.

Primary Conceptualizations

As interest increased regarding more dynamic work environments, numerous constructs and research paradigms emerged, each of which highlight different aspects of how people interact with and influence their environment. With this proliferation comes the need for clarity. Specifically, we define adaptive performance (AP) as 'task-performance-directed behaviors individuals enact in response to or anticipation of changes relevant to job-related tasks' (Jundt, Shoss, & Huang, 2014, pp. 54–55). Like Griffin, Neal, and Parker (2007), we view AP as behaviors focused on changing oneself (e.g., strategies, tactics, skills, etc.) in reaction to or anticipation of (e.g., Cronshaw & Jethmalani, 2005; Ployhart & Bliese, 2006) environmental changes. AP, then, focuses on adjusting to external

change rather than initiating change, thus distinguishing it from proactivity or proactive performance (e.g., Griffin et al. 2007; Thomas, Whitman, & Viswesvaran, 2010), even though moderate positive correlations between these behaviors appear to exist (Griffin et al., 2007). The definitional focus on AP as behavior directed at maintaining or enhancing task performance in changed or changing environments also helps distinguish AP from related constructs such as innovation or flexibility, which may contribute to AP but are not necessarily synonymous with it (see Jundt et al., 2014 for a review).

As noted above, empirical investigations of AP have primarily followed one of the two paradigms. We refer to these as the *task change* and *performance evaluation* paradigms, respectively. Research across these two paradigms is characterized by differences in methodology, operationalization of AP, and research contexts. Both reveal relevant insights into important antecedent factors predicting AP. Subsequently, we highlight the important characteristics of each paradigm and use the two paradigms for organizing the subsequent literature review and highlighting relevant themes. We organize the following sections from task change to performance evaluation paradigms to move from specific and proximal to general and distal understanding of AP.

The *task change paradigm* (also referred to as the 'domain specific' paradigm by Baard, Rench, & Kozlowski, 2014) has been the dominant paradigm for examining factors that influence AP. As discussed by Lang and Bliese (2009), this paradigm involves examining individual (or team) performance over more than one occasion where participants initially acquire skill over multiple iterations of a task and subsequently face a change that makes that task more difficult or complex. There are a number of characteristics that denote research conducted via the task change paradigm. First, AP is often examined at a single point in time after a change occurs (see LePine et al., 2000; Stewart & Nendkeolyar, 2006) through the use of objective performance criteria. Also, the nature of the change is often ambiguous or completely unexpected by participants (see Chen, Thomas, & Wallace, 2005; Ford et al., 1998; Kozlowski et al., 2001 for exceptions), which yields a focus primarily on reactive (as opposed to proactive; see Huang, Ryan, Zabel, & Palmer, 2014) elements of AP. In addition, the primary focus has been on fairly distal antecedents, while little attention has been paid to in situ behaviors, cognitions, and affective

responses that occur during actual AP (see Chen et al. 2005 for a notable exception). Because much of this work has been situated in the training literature, researchers from this perspective have looked at malleable features of the way tasks are initially learned as predictors of AP. Finally, this research is often conducted over fairly short time periods, typically in a laboratory context.

Research in the *performance evaluation paradigm* (also captured under the ‘domain general’ paradigm by Baard et al., 2014) is characterized by a broader, more general approach where the focus is often on global ratings of adaptive success (or behaviors) in novel or fluctuating situations. Research in the performance evaluation paradigm also displays a number of distinguishing characteristics. In contrast to task change research, broad or nonspecific (in relation to actual task changes) time frames are often used, which presumably capture elements of both proactive and reactive AP. In addition, AP is usually assessed via subjective supervisor ratings as part of broader performance assessments, although some studies have used subjective self-ratings (Griffin et al., 2007; Griffin, Parker, & Mason, 2010). Also, performance evaluation research is often conducted in a cross-sectional manner in field settings. Similar to research in the task change paradigm, however, little attention has been paid to the behaviors, cognitions, and affective responses that people engage in while trying to adapt. Instead, there has been a focus on personality and more stable antecedents, largely driven by the assumption that there are stable individual differences in individuals’ proclivities to adapt and the associated idea that employee AP can be achieved via selection (Ployhart & Bliese, 2006).

CRITICAL REVIEW OF THE ADAPTIVE PERFORMANCE LITERATURE

Review of Task Change Research Paradigm

The majority of studies using the task change paradigm have approached AP from a training perspective. Training studies on AP are driven by the practical need to understand how to develop training such that employees can rapidly and flexibly adapt knowledge and skills. Smith et al. (1997) provided the initial impetus to think about adaptability from a training perspective by suggesting that prior work in training had focused primarily on training for ‘routine’ rather than ‘adaptive’ expertise. They suggested that simply being able to execute work-related tasks (routine

expertise) is not enough in turbulent work environments. Rather, people need a more complete understanding of the requirements and structure of work tasks in order to be able to successfully adapt to changing task demands.

In order to develop this type of adaptive expertise, Smith et al. (1997) proposed that individuals must first develop detailed knowledge of the task domain. This involves gaining well-developed declarative and procedural knowledge structures containing a wide range of potential problems and related solutions that are tightly linked together. This knowledge, however, may not be enough, as individuals must also have meta-cognitive skills related to planning, monitoring, and evaluating their behavior. These skills allow individuals to recognize changes and successfully transfer relevant knowledge to novel tasks. The notion that detailed knowledge of the task domain is an necessary prerequisite for AP has been borne out in studies linking knowledge structure coherence, declarative and procedural knowledge, and strategic knowledge regarding the initial trained task to AP (e.g., Bell & Kozlowski, 2002; Bell & Kozlowski, 2008; Chen et al., 2005; Ford et al., 1998; Kozlowski et al., 2001), as well as in studies linking initial skill-based training performance to AP (Bell & Kozlowski, 2002; Bell & Kozlowski, 2008; Ford et al., 1998; Kozlowski et al., 2001). Supporting the idea that knowledge is necessary but not sufficient for AP, researchers have also consistently found positive effects for meta-cognition as a predictor of AP (e.g., Bell & Kozlowski, 2008; Chen et al., 2005; Ford et al., 1998).

Researchers have also proposed that self-efficacy, or confidence, as an additional critical component for the adaptive application of knowledge (Chen et al., 2005; Ford et al., 1998). Following arguments by Bandura (1997; Bandura & Wood, 1989), self-efficacy should encourage individuals to exert more effort toward the task at hand and be more resilient in the face of setbacks, both of which are particularly important when individuals are trying to perform a task that is either more difficult, complex, or that has different rules than the one trained (Chen et al., 2005; Ford et al., 1998). This hypothesis has been supported across a number of studies (e.g., Bell & Kozlowski, 2008; Chen et al., 2005; Ford et al., 1998; Kozlowski et al., 2001).

It is important to note that there is still some inconsistency in the literature regarding whether knowledge, meta-cognition, and self-efficacy influence AP directly, or by influencing each other. For example, some suggest that the influence of self-efficacy and meta-cognition operate through increased knowledge and skill in learning the initial task (Bell & Kozlowski, 2002, 2008; Ford et al., 1998). Others link meta-cognition, knowledge,

and self-efficacy to AP directly (Kozlowski et al., 2001). Unfortunately, no studies have tested competing models of these pathways, thus making it difficult to accumulate knowledge regarding how these training outcomes influence AP.

Despite this ambiguity, a key contribution of training studies is the finding that these training outcomes are malleable and, as a consequence, the ways in which tasks are initially learned can influence AP. Researchers have examined four training components: exploratory learning, guidance, error training, and training goals. Bell and Kozlowski (2008) found that exploratory learning features in training were associated with higher meta-cognitive activity, especially for those higher in cognitive ability. Meta-cognition, in turn, influenced AP via motivational and knowledge-based pathways. Despite these findings, research in the learning literature has generally pointed to the potential pitfalls of truly exploratory learning (e.g., inaccurate and incomplete schemas, frustration), and has instead encouraged the use of guidance, especially when training complex tasks (Clark, 2004; Clark & Feldon, 2008; Kirschner, Sweller, & Clark, 2006). Bell & Kozlowski (2002) provided participants with progressively tailored information about what areas they should focus and improve on as they engage in future task iterations, first focusing on basic task knowledge and skills and later moving toward more complex and strategic knowledge and skills (i.e., adaptive guidance). They found that these adaptive guidance techniques were related to more appropriate study and practice strategies, on-task cognition, and higher self-efficacy. In turn, these factors influenced task knowledge and skill, which ultimately predicted AP.

Relatively more research attention has been devoted to error management training (see Frese & Altmann, 1989). By encouraging individuals to make and understand errors, error training helps promote meta-cognitive and problem-solving skills (Heimbeck, Frese, Sonnentag, & Keith, 2003; Ivancic & Hesketh, 2000). Moreover, because errors are viewed positively, error training can help quell anxiety that might disrupt learning and motivation (Heimbeck et al., 2003). Indeed, researchers have found that error training facilitates performance on tasks that are more complex or require different strategies than the tasks trained (Ivancic & Hesketh, 2000; Keith & Frese, 2005), and that these positive effects occur via both emotion control and meta-cognitive pathways (Keith & Frese, 2005). There is some evidence, however, that the effectiveness of error training is moderated by individuals' trait goal orientations (Bell & Kozlowski, 2008; Heimbeck et al., 2003).

Research has also manipulated the goals given to individuals in training programs. Kozlowski

et al. (2001) found that mastery-training goals (e.g., Dweck, 1986; Nicholls, 1984) were related to more complex knowledge structures and higher levels of self-efficacy, which were both related to higher levels of adaptive task performance after training. Trait-learning orientation also had a positive influence on AP through self-efficacy (see also Ford et al., 1998).

Studies utilizing the task change research paradigm have also pointed to the importance of individual characteristics as predictors of AP. For example, Kozlowski et al. (2001) found that general mental ability positively related to knowledge developed during training and enhanced AP via this mechanism (see also Bell & Kozlowski, 2002; Bell & Kozlowski, 2008). As another example, LePine et al. (2000) operationalized AP as decision-making accuracy after changes in proper decision-making rules occurred. They found that cognitive ability and openness to experience both became better positive predictors of decision-making accuracy when people had to adapt to changes in the simulation. Contrary to their hypotheses, however, conscientiousness (the dependability component) was negatively related to decision-making accuracy when people had to adapt to changes in the simulation. They also found that cognitive ability was a stronger positive predictor of decision-making accuracy when people had to adapt to changes in decision-making rules than it was prior to unforeseen changes in the task.

Aside from traditional personality trait variables, two studies utilized a novel approach to personality measurement to predict AP. Minbashian, Wood, and Beckmann (2010) argued that personality traits only capture individuals' typical behavioral tendencies and ignore adaptive response to dynamic situational influence (also see Huang & Ryan, 2011). They further reasoned that task-contingent conscientiousness – the tendency to elevate one's momentary conscientiousness when dealing with challenging tasks – can enable the individual to adapt to changing and difficult tasks. The authors utilized experience-sampling methodology to measure a group of managers' task-contingent conscientiousness, and demonstrated that task-contingent conscientiousness but not trait conscientiousness predicted AP on a cognitively challenging task. Following the same rationale, Huang and Bramble (2014) developed a self-report measure for task-contingent conscientiousness. Using a training study that entailed adaptive responses in a dynamic transfer environment, they demonstrated that task-contingent conscientiousness had a direct effect on post-training AP, whereas trait conscientiousness had an indirect effect on AP through state conscientiousness and knowledge acquisition.

Job context can also impact how individuals deal with changes in specific tasks. In a particularly interesting study, Bond and Flaxman (2006) found that job control was related to AP post-training, especially for individuals with high levels of psychological flexibility (i.e., 'contacting the present moment fully and, depending upon what the situation affords, acting in accordance with one's chosen values', p. 116). They argued that job control helps employees cope more effectively with new demands and the reduced distress enhances employees' abilities to adapt. Thus, these studies also point to knowledge and affective pathways through which variables influence AP.

One particularly informative application of the task change paradigm is research that considers intraindividual trajectories of performance before and after task changes. Lang and Bliese (2009) conducted an explicit examination of how individuals initially performed in response to a change (transition adaptation) and the subsequent trajectory of their performance (reacquisition adaptation) *controlling for* their levels of initial pre-change performance and skill acquisition. Their results suggested that individuals with high cognitive ability initially performed better on the simulation task than those with low cognitive ability and those differences were maintained throughout the initial skill acquisition period. However, individuals with higher cognitive ability showed a more substantial drop in performance immediately after experiencing a change and did not show different subsequent performance trajectories than those with lower cognitive ability. It is important to note here that cognitive ability showed significant positive zero-order correlations with aggregate measures of task performance both pre- and post-change, indicating that high cognitive ability individuals perform better post-change in an absolute sense. We believe the methodology and analyses used by Lang and Bliese hold great promise for furthering our understanding of adaptation.

Consistent with the theoretical assumption and empirical findings of the task change studies (e.g., Kozlowski et al., 2001), the review above suggests training can be one valuable avenue for enhancing individual capacity for AP on specific task dimensions. Along these lines, Cronshaw and Jethmalani (2005) suggest that skills related to adaptation can develop throughout one's life and career.

Review of Performance Evaluation Research Paradigm

Studies coming from a performance evaluation perspective conceptualize and operationalize AP

more broadly than training studies. This broad approach largely builds on Pulakos and colleagues' (2000) work to define eight different work situations demanding AP. Despite evidence of an eight-dimensional structure for past experience, interest, and self-efficacy in adapting (Pulakos et al., 2000; Pulakos, Schmitt, Dorsey, Arad, Hedge, & Borman, 2002), supervisors took a more global approach when rating employees' AP and thus, a one-factor solution emerged for supervisor ratings (Pulakos et al., 2002). Similarly, Huang et al. (2014) also identified single-factor solutions for supervisor ratings of AP at work. These findings are important because they suggest that when supervisors are considering their subordinates' AP, they are not only considering level of performance after a task change (which would parallel the task change paradigm), but also are considering, for example, how employees appear to manage the stress associated with change and the extent to which they solve problems creatively. Indeed, Griffin et al. (2007, p. 337) suggested AP could be evaluated by supervisor ratings of the degree to which individuals 'adapted well to', 'coped well with', and 'learned new skills to adapt to' changes in core tasks. It may, therefore, be that studies using the performance evaluation paradigm are not directly comparable to studies using the task change paradigm. Alternatively, the fact that ratings load on one dimension may suggest some similar underlying processes across various manifestations of AP.

As previously noted, performance evaluation studies have largely taken a selection perspective following the adaptability assumption – the theoretical assumption that the propensity to adapt resides within the individual, as captured in individual difference variables. Defined by Ployhart and Bliese (2006, p. 13), adaptability reflects 'an individual's ability, skill, disposition, willingness, and/or motivation, to change or fit different task, social, and environmental features', although Ployhart and Bliese (2006) emphasized stable between-person differences in adaptability. Within this perspective, the majority of attention has been focused on identifying individual difference predictors of supervisor- and self-ratings of AP. Despite their differences, training and performance evaluation studies are driven by a similar theoretical stance in that they view AP as being driven by motivational, knowledge, and self-regulatory variables, as well as their distal individual difference predictors. However, with the exception of some work done on contextual drivers of AP (e.g., Charbonnier-Voirin, El Akremi, & Vandenberghe, 2010; Shoss, Witt, & Vera, 2012), the performance evaluation studies tend to view these variables as stable over time consistent with a selection framework.

In particular, researchers have frequently speculated that AP requires individuals to stay calm, motivated, and persistent when dealing with change. Thus, stable individual differences on factors such as coping with stress, interest in novelty, and persistence, as captured in the Big Five, have been used to predict and understand AP. However, mixed findings have emerged for the relationship between Big Five factor level traits and AP. For example, B. Griffin and Hesketh (2003) found that openness to experience positively predicted supervisor ratings of AP behaviors in a public service organization but not in a multinational IT organization, while conscientiousness did not significantly predict ratings in either sample. Pulakos et al. (2002) found that emotional stability positively and significantly predicted supervisor ratings of AP in a sample of military personnel, while openness to experience did not. In a large sample of government workers, Neal, Yeo, Koy, and Xiao (2012) found that only emotional stability and conscientiousness showed significant associations with individual AP, both positive yet weak. In their examination of Big Five traits as predictors of supervisor ratings of AP behaviors in a sample of call center employees, Shoss et al. (2012) found that only openness to experience and conscientiousness were significantly related to AP behaviors, both in the positive direction. In contrast, Allworth and Hesketh (1999) found that none of the Big Five significantly related to AP ratings in two samples of hotel staff members, whereas Blickle et al. (2011) reported only extraversion out of the Big Five factors had a significant association (in the positive direction) with AP.

Attempting to reconcile the inconsistent effects of Big Five factors in the literature, Huang, Zabel, Ryan, & Palmer (2013) conducted a small-scale meta-analysis and found that emotional stability and conscientiousness were both positively associated with AP, while extraversion, agreeableness, and openness did not have significant effects. More importantly, drawing from the evolutionary perspective to develop hypotheses, Huang and colleagues (2014) meta-analyzed archival data with 71 studies to clarify personality traits' effect on AP. They identified a positive effect of emotional stability on supervisor ratings of AP. They also demonstrated that the ambition aspect of extraversion, but not the sociability aspect, predicted AP. This finding echoed earlier research assessing narrow personality traits (i.e., aspect or facet level; see DeYoung, Quilty, & Peterson, 2007) – e.g., achievement orientation (Pulakos et al., 2002) and intellect (B. Griffin & Hesketh, 2004) – to indicate that increased specificity in personality measurement may prove advantageous over broad personality traits (i.e., factor level) in predicting AP.

In addition to illuminating the effects of personality traits on AP, Huang et al. (2014) also shed light on the construct domain of AP. Although their exploratory factor analysis revealed a single factor for supervisor-rated AP, they found support for the hypotheses that emotional stability and ambition relate differently to two forms of AP – reactive versus proactive. While emotional stability was more important for predicting individuals' reactive responses to changes occurring at work, ambition carried greater import when predicting proactive pursuit of changes at work. The differential relationships between personality traits and reactive/proactive AP underscore the need to clearly specify the form of AP being investigated in a research study. We also note that the personality traits identified as predictors of AP (e.g., conscientiousness, emotional stability, ambition) have also been identified as predictors of overall job performance (Hogan & Blickle, 2013). Additionally, both emotional stability and conscientiousness have also been identified as predictors of counterproductive work behaviors (CWBs) and organizational citizenship behaviors (OCBs) (Borman & Conway, 2013; Salgado, Moscoso, & Anderson, 2013). Research is needed to examine the extent to which differential validity exists for personality, as well as the other antecedents identified here, in predicting AP versus other dimensions of performance.

Similar to personality traits, the effect of self-efficacy on AP is less consistent in the performance evaluation studies than in the training studies. For example, Pulakos et al. (2002) did not find that interest in adapting and self-efficacy to adapt predicted supervisor ratings of AP. However, Stokes, Schneider, and Lyons (2010) examined self-efficacy in a similar manner to Pulakos et al. (2002), but found that it was positively related to both subjective and objective measures of AP. While not directly hypothesized, Griffin et al. (2010) reported that role breadth self-efficacy positively related to self-ratings of adaptation frequency in the past month. Consistent with the training studies, however, Schraub, Stegmaier, & Sonntag (2011) found that emotion regulation activities helped mitigate the effects of perceived change severity on experienced strain (e.g., cognitive and emotional irritation), which was negatively related to AP.

With regard to ability/learning factors, field studies have also found a positive effect for cognitive ability as a predictor of AP (Allworth & Hesketh, 1999; Blickle et al., 2011; Pulakos et al., 2002). There is also evidence that past experience of adapting to change (reflecting the accumulation of skill relevant to AP) positively impacts AP (Allworth & Hesketh, 1999; Pulakos et al., 2002).

Surprisingly, however, Pulakos et al. found that past experience on their learning dimension was positively associated with AP ratings, while past experience on their interpersonal dimensions was negatively related to AP. Also supporting the notion that learning is crucial for AP, greater knowledge of customers in a sales context (Gwinner, Bitner, Brown, & Kumar, 2005) and individual continuous learning activities (Han & Williams, 2008) have been linked to AP. Importantly, Chai, Zhao, and Babin (2012) suggest that the impetus to learn may come from the perception that one's skills are becoming obsolete. They found that mastery and performance prove orientations predicted perceived skill obsolescence (positively and negatively, respectively) and that perceived skill obsolescence partially mediated the relationship between learning orientation and AP.

Two field studies have employed performance trajectories after changes occur in employees' job performance, and thus bridged task change and performance evaluation paradigms. Stewart and Nandkeolyar (2006) examined intraindividual sales performance over multiple time periods as a function of opportunities (referrals) and personality factors, where AP was operationalized as the strength of intraindividual link (i.e., slope) between referrals and sales performance. Their results indicated that this link was stronger for those with high (as opposed to low) conscientiousness and those with low (as opposed to high) openness to experience, suggesting that these characteristics allowed individuals to better adapt strategies and take advantage of opportunities. Thoresen, Bradley, Bliese, and Thoresen (2004) examined the Big Five personality factors as predictors of mean job performance levels and growth trajectories (linear and quadratic) for salespeople during job transitional periods (Murphy, 1989), which were discussed as situations where methods and strategies were undefined and employees had to potentially learn new skills (Murphy, 1989; Thoreson et al., 2004). Mean levels of transition performance were influenced positively by agreeableness and openness. Linear performance slopes (indicating initial changes in performance) were positively related to agreeableness and negatively related to emotional stability. Finally, quadratic trends (indicating a deceleration in performance improvement) were stronger for those with high levels of openness, thus somewhat echoing Stewart and Nandkeolyar's (2006) counterintuitive finding. Together with Lang and Bliese's (2009) findings, these studies suggest the relationship between individual difference characteristics and AP is nuanced and may depend on how one defines AP (e.g., absolute levels of performance post-change, degree of performance

decrease immediately post-change, trends in performance gains, etc.).

Because performance evaluation studies have largely taken a selection perspective, they have tended to not focus on contextual predictors of AP. This is unfortunate because employees decide whether and how to allocate time and effort based in large part on what they perceived will be valued, rewarded, and supported in the workplace. Moreover, organizations and supervisors have the ability to reduce anxiety about changes by providing information and encouragement (Zaccaro & Banks, 2004). Indeed, Griffin et al. (2010) found that leader vision for change (similar to charismatic/transformational leadership) positively influenced self-ratings of adaptation frequency in the previous month, particularly for individuals with high openness to work role change. Charbonnier-Voirin et al. (2010) found that individual perceptions of transformational leadership positively influenced AP behaviors, and that this relationship was stronger to the extent that individuals worked in teams with a strong climate for innovation. Emphasizing the importance of context, Shoss et al. (2012) argued that if the work context is ambiguous in terms of expectations and reward structures (i.e., there are high levels of perceived politics), AP efforts might not effectively translate into high levels of task performance in light of changes.

An important consideration for future research involves the extent to which AP evaluations influence overall performance. Johnson's (2001) finding that handling work stress contributes incrementally to ratings of overall performance over task proficiency and other performance behaviors (e.g., citizenship performance) provides some insight into these dynamics. However, more work is needed to consider how other dimensions of AP contribute to overall performance evaluations, as well as to consider the extent to which the relative contribution of AP to overall performance ratings vary as a function of the AP demands employees face. Moreover, Shoss et al.'s (2012) finding that the moderate association between AP and task performance was qualified by a three-way interaction between conscientiousness, organizational politics, and AP suggests that both the organizational context and individual differences influence the extent to which AP can translate into higher overall performance.

EMERGING RESEARCH AND FUTURE DIRECTIONS

Our review above focuses on the two primary paradigms investigating individual AP. However,

outside the paradigms reviewed above, there are a number of additional research areas with emerging investigations pertaining to individual AP. In the sections that follow, we attempt to integrate across literatures that have traditionally had different foci but yet might offer critical insights for AP and avenues for AP research. In particular, all of these areas of research suggest a need for greater attention to the context of AP. Subsequently, we highlight additional topics we view as important for future investigations.

Broader Conceptualization of Adaptive Performance

Work environments offer different opportunities for changes, and hence require different levels and manifestations of AP (see Huang et al., 2014). Indeed, whether an individual needs to demonstrate proficiency in each of the eight dimensions of AP in Pulakos et al. (2000) will depend on the degree and dimension of change in his/her work context. That is, to the extent that (drastic) changes occur in one's job environment, we can expect workers to engage in AP. Two such changes are entering a new work organization and embarking on an expatriate assignment. Consequently, we assert that AP underlies newcomer performance and expatriate performance. When newcomers join an organization, they need to adjust to their tasks and roles, learn the organization's policies, procedures, and climates, and establish interpersonal relationships with co-workers. For expatriates, the most salient need for adaptation is likely the new cultural context in which they perform work tasks and communicate with others. These behaviors fall under the various dimensions identified in Pulakos et al. (2000). Thus, we argue that, researchers can gain better insight on AP by integrating research on newcomer adaptation and expatriate adaptation. As such, we review key studies in these respective areas to inform current understanding on AP.

As newcomers enter an organization, they need to deal with the uncertainty in the new environment (Berger & Calabrese, 1975). Although newcomers' characteristics and behaviors are still expected to influence their performance, the organizational context that affords newcomers an opportunity to reduce uncertainty plays a critical role. Chen (2005) examined newcomers' adaptation to teams and tested the influence of team context on newcomers' performance. He found that newcomers performed better initially in teams that empower newcomers and had higher expectations for their performance. Furthermore, compared to

newcomers entering teams with low initial team performance, those joining teams with high initial team performance experienced more positive performance improvement over a three-month period of time.

In a meta-analytic investigation of newcomer adjustment, Bauer, Bodner, Erdogan, Truxillo, and Tucker (2007) examined newcomers' information-seeking and organizational socialization tactics as distal antecedents to newcomer performance. The results indicate both newcomers' proactive behaviors in reducing uncertainty and organizations' effort to facilitate the adjustment process can lead to higher newcomer performance. More important, the effect of these two distal predictors was completely mediated by newcomers' role clarity, self-efficacy, and social acceptance.

Recent research also started to include individual difference variables as predictors of newcomer performance. For example, Wang, Zhan, McCune, and Truxillo (2011) examined individuals' adaptability (Ployhart & Bliese, 2006) as antecedents of their adjustment and performance. Using a longitudinal design, they demonstrated that newcomers with high levels of adaptability tended to perceive a better fit between themselves and the organization/job, which subsequently led to higher performance.

Similarly, the expatriate performance literature models both the work context and the individual in understanding successful adaptation to foreign assignments. For example, Kraimer, Wayne, and Jaworski (2001) found that positive leader-member exchange had a direct influence on expatriate performance, whereas perceived organizational support in the foreign facility influenced expatriate performance indirectly through perceived adjustment to the work and interpersonal contexts. In contrast, Mol, Born, Willemsen, and van der Molen (2005) conducted a meta-analytic investigation on the influence of individual difference variables (primarily personality traits) on expatriate performance. Extraversion, emotional stability, and conscientiousness positively predicted non-self-reported expatriate performance, whereas agreeableness and openness showed positive yet inconsistent effects. Mol et al.'s (2005) findings served as an interesting comparison against Huang et al.'s (2014) meta-analytic results that showed ambition (an aspect of extraversion) and emotional stability positively predicted AP.

In addition, the AP literature can integrate research findings on intraindividual change of performance over time (i.e., dynamic criteria). Some of these studies focus on the initial period after hiring and often include selection instruments as predictors of change over time. For instance, Deadrick, Bennett, and Russell (1997)

modeled newly hired sewing machine operators' performance over a 24-week period and found that operators' performance improvement trend was predicted positively by cognitive ability and negatively by experience. As another example, Ployhart and Hakel (1998) identified empathy assessed from a biodata form as predictor of performance increase over time for a sample of security salespersons. Other studies examine intraindividual variation in performance associated with external factors (e.g., leadership role assignment, Day, Sin, & Chen, 2004; constraints imposed by opponents and co-workers, Stewart & Nandkeolyar, 2007). In these studies, it is plausible that AP serves as an intermediate link that precedes change in performance.

Another body of literature that can be integrated with AP is the sales/service performance literature. Spiro and Weitz (1990) recognized the futility in developing standardized selling behaviors that could be effective for all customers and argued that salespeople should customize and personalize their approach to the individual needs of customers in order to be successful (also see McIntyre, Claxton, Anselmi, & Wheatley, 2000). Accordingly, Spiro and Weitz (1990) defined adaptive sales performance as changing one's behaviors based on perceptions and knowledge gained across interactions with customers. Indeed, in an experience-sampling study of service employees, service employees reacted differently to momentary changes in service contacts, and the difference could be attributed to the job context they worked in (Huang & Ryan, 2011). Researchers have started to identify factors that predict adaptive sale performance. For instance, Gwinner et al. (2005) examined cognitive (e.g., customer knowledge) and motivational (e.g., intrinsic motivation) factors that predicted adaptive sales behavior. Although in a different context (adapting to changes in work environment versus adapting to different customers), it remains an empirical question whether some findings from the AP literature can be generalized to the adaptive sales/service literature.

Team Adaptive Performance

There is a burgeoning theoretical (e.g., Burke, Stagl, Salas, Pierce, & Kendall, 2006; Kozlowski, 1998; Kozlowski, Gully, McHugh, Salas, & Cannon-Bowers, 1996a; Kozlowski, Gully, Nason, & Smith, 1999; Kozlowski, Gully, Salas, & Cannon-Bowers, 1996b) and empirical (e.g., LePine, 2003; Marks, Zaccaro, & Mathieu, 2000; Moon, Hollenbeck, Humphrey, Ilgen, West, Ellis,

& Porter, 2004) literature on team AP. While a formal review of this literature is beyond the scope of this chapter (but see Baard et al., 2014 and Ilgen, Hollenbeck, Johnson, & Jundt, 2005, for partial reviews), we feel that there are developments at the team level that could have particularly important implications for theory and research at the individual level; we discuss two of those below.

In general, the team literature has taken a more dynamic view of process aspects of AP (e.g., Burke et al, 2006; Kozlowski, Watola, Jensen, Kim, & Botero, 2009), and in this respect there is much that could be used to inform individual-level research. A series of works by Kozlowski and colleagues approaches process from a developmental standpoint, with the primary focus being on the development of adaptive teams over time and the importance of leadership for guiding this development. Kozlowski, Gully, McHugh, Salas, and Cannon-Bowers (1996a); Kozlowski, Gully, Salas, and Cannon-Bowers (1996b); Kozlowski (1998); and Kozlowski, Gully, Nason, and Smith (1999) offer the perspective that team adaptability and coordination are functions of team coherence (i.e., shared affect, cognition, and behaviors in the team). Kozlowski and colleagues (1996a, 1996b) explicitly discuss the importance of individual task and skill training and development within dynamic, repeating cycles of task intensity over time as something that drives the development of coherence, and thus adaptive teams (Kozlowski et al., 1999). In a similar vein, Burke et al. (2006) view team AP as including a series of steps or processes focused on situation assessment, plan formulation, plan execution, and team learning. They, however, focus primarily on team composition variables and emergent states as drivers of progression through these steps and, ultimately, AP. Critically, both approaches view AP (and related capabilities) as something that manifests over time through repeated attempts and iterations. While some research and theory at the individual level has taken this sort of dynamic approach (i.e., Chen et al., 2005; Keith & Frese, 2005; Ployhart & Bliese, 2006), we still know relatively little about what individuals actually do (or need to do) in order to respond to changes in their task environment. Clearly, the team AP literature suggests that this type of approach has value. Further explication of process factors and development of process-based theoretical models at the individual level could help us to better understand not only how people adapt, but also why certain strategies or approaches are successful and, by extension, how more distal antecedents (e.g., individual differences, training techniques, leadership, etc.) exert influence.

A line of research by Hollenbeck, Ilgen, and colleagues (e.g., Beersma, Hollenbeck, Conlon, Humphrey, Moon, & Ilgen, 2009; Hollenbeck, Ellis, Humphrey, Garza, & Ilgen, 2011; Johnson, Hollenbeck, Humphrey, Ilgen, Jundt, & Meyer, 2006) on Structural Adaptation Theory also highlights potentially important considerations for individual-level research. This work is rooted in contingency theories of structure and focuses on the impact of changes in team structure on team performance, suggesting that while certain structures may be more appropriate in given situations (a fundamental contingency theory prediction), teams may not be able to adapt to changes in certain ‘directions’ of structural change as well as others. For example, Moon et al. (2004) focused on team task allocation structure and found that teams who started in a functional structure were able to adapt readily to a change to divisional structure, while teams that started in divisional structure were not able to successfully execute a change to a functional structure. This asymmetrical adaptation has also been found for changes in reward structure (Beersma et al., 2009; Johnson et al., 2006) and decision-making structure (Hollenbeck et al., 2011). These studies highlight two critical issues that could be further explored at the individual level. The first, as described in additional detail below, is that context is critical. In this case, initial context (in the form of initial structure and its interaction with task conditions) had implications for the development of norms that then persisted even after structures changed, thus impacting future behavior. This work suggests that people develop norms and strategies for working in given situations. To date, however, there has been no work that we are aware of at the individual level that focuses on characteristics of the situation being adapted *from* in addition to characteristics of the situation being adapted *to*; we believe that work of this nature could be quite valuable.

A second, related issue highlighted by this work is that we need to more explicitly examine ‘how’ tasks change. Existing work in the task change paradigm has primarily focused on adaptation to increasingly novel, ill-defined, more difficult, and/or more complex tasks, often with little specification of what elements actually change or what the implications are. On the other hand, work in the performance evaluation paradigm has been somewhat silent about the nature of changes being faced or has relied on the Pulakos et al. (2000; 2002) taxonomy to discuss change types at a broad level. This approach, while certainly useful for differentiating among large classes of tasks where things can change, is something of a ‘between-task’ approach. We suggest that research could benefit greatly from the development and testing of alternative (and

complementary) ‘within-task’ approaches, which would focus on breaking down the elements of a given task, classifying what parts of a given task are actually changing over time, and investigating the implication of different types and ‘directions’ of change on these different dimensions.

The Role of Adaptive Performance Context

Although exceptions exist, the AP literature is marked by a general failure to explicitly and systematically model the context – in particular, the nature of AP demands and the particular work context in which AP takes place. As a consequence, we have limited insight with regard to how contextual factors may impact the relationship between predictors and AP, or even the types of contextual factors that might be relevant for AP. This may be due in large part to the adaptability assumption implicit in most research that proclivities to adapt and adapt successfully are related to stable individual differences. However, we argue that three elements in the research findings reviewed above would suggest a considerable need to consider context. Namely, (1) the ubiquity of inconsistencies in the results across research studies (see Huang et al., 2014 for a meta-analytic estimate of the variability in personality–AP relationships), (2) the fact that training studies typically find that training manipulations influence AP (e.g., Bell & Kozlowski, 2002; 2008), and (3) that studies that have incorporated various contextual variables (e.g., leadership; Griffin et al., 2010) typically find significant results for these variables, all suggest that context should not be ignored.

Johns (2006) suggests that context can be thought of in terms of omnibus context and discrete context. Omnibus contexts specify the who, what, when, where, and why of AP. These broad contexts influence behavior and relationships between variables via the discrete contexts they create. Johns suggested that discrete contexts include the task, social, and physical contexts in which work takes place. What are the various task contexts of AP? As previously noted, in their seminal work, Pulakos et al. (2000) created a taxonomy of different task contexts of AP in terms of the adaptive demands of different jobs. Pulakos et al.’s (2000) early emphasis on context, however, has faded from much of the AP research in both primary paradigms. Research stemming from the task change paradigm has tended to focus on a single adaptive demand (i.e., learning and adjusting work tasks), and thus oversimplifies the complex work environment workers

actually transfer from their training. Indeed, transferring newly acquired knowledge and skills – especially those dealing with general principles rather than precise repetitions – to the actual work context (Blume, Ford, Baldwin, & Huang, 2010) may impose more varied adaptive demands than dealing with task changes in a simulated environment (see Barnett & Ceci, 2002).

Moreover, studies from the performance evaluation standpoint have tended to provide limited detail about the specific types of adaptive demands to which workers need to attend. As Pulakos et al. (2000) and Ployhart and Bliese (2006) pointed out, it may be unreasonable to assume that the same knowledge, skills, abilities, and other personal characteristics (KSAOs) needed to adapt to one set of demands will be the same as the KSAOs needed to adapt to another set. Certainly, theory on personality and job performance would echo this point, suggesting that certain sets of KSAOs may be differentially activated and differentially related to certain contexts (Tett & Burnett, 2003). However, the degree to which adapting to each of these different types of demands is different from each other remains an empirical question, and an important one at that.

The broader context in which adaptive demands are situated may also be relevant. For example, are employees adapting because their skills are obsolete or are they adapting to stay ahead of the curve? Do adaptive demands stem from a company buy-out or a budget crisis? Are employees adapting because their company is opening up new locations, or there is a shift in organizational strategy and structure? Do employees believe that a failure to adapt will have negative repercussions for their careers and job security? Have employees been given specific information about how, when, what, and why to adapt? Are employees in the company generally enthusiastic or disquieted about change? How much time are employees being given to adapt? These contexts may not only shape the specific adaptive demands with which employees are faced, but also the meaning employees ascribe to these demands. It is this uncertainty and ambiguity that Johns suggests makes the examination of context so critical. Moreover, the fact that AP generally takes place in these arguably emotionally charged and social contexts raises questions about the generalizability of laboratory-based AP studies, as well as how to reconcile conflicting results between and within laboratory and field AP studies. As Johns (2006) points out, addressing these issues requires the explicit specification, and ideally measurement, of these important contextual variables (also Funder, 2006; Meyer, Dalal, & Hermida, 2010).

The Variable Person in the Dynamic Context

One way to start contextualizing work on adaptability is to ask: in what situations is a person with ‘adaptive’ traits likely to be adaptive? While this approach is likely to add some valuable insights, an alternative way of specifying this question raises some intriguing ideas. Namely, can we create situations where everyone is adaptive, regardless of individual proclivity? Answers to this question are arguably of considerable value to organizations that have an interest in ensuring uniformly high levels of AP across all workers. The training research described earlier provides some clues. Research on situation strength may provide others (Mischel, 1977). Meyer et al. (2010; also Meyer, Dalal, & Bonaccio, 2009) suggest that strong situations are those that are marked by (a) clarity of responsibilities and requirements, (b) consistency of information regarding the appropriate course of actions, (c) restriction in opportunities for decisional and behavioral discretion, and (d) the existence of important consequences that are tied to actions. Others point out that individuals also need to have the ability to enact the behavior (Cooper & Withey, 2009; Mischel, 1977). Strong situations serve to restrict individual variability by providing unambiguous cues and incentives regarding the specific behaviors to perform. In a meta-analysis, Meyer et al. (2009) demonstrated that strong situations (at the occupation level) reduce the conscientiousness–overall performance relationship, and argued that individual advantages in performance become neutralized to the extent that strong situations exist. Just as it is possible to create strong situations for task performance, it may also be possible to create strong situations for AP through connected leadership, training, and human resource activities. Indeed, organizational socialization for newcomers and predeparture training for expatriates both represent attempts to facilitate individuals’ capacity to adapt in requisite ways. Identifying methods to prepare for AP reflects an important direction for future research.

More importantly, we emphasize the need to follow the interactionist perspective and recognize that AP is simultaneously influenced by the person, the situation, and their interactions. Rather than focusing solely on the person’s stable personality traits, assessing situational-contingency (Fleeson, 2001, 2007) of a trait domain can provide valuable information about an individual’s potential to engage in adaptive behavior. Much like Mischel and Shoda’s (1995) ‘*if...then...*’ behavioral signature, situational-contingency captures the degree to which a person elevates his/her momentary state

when dealing with a particular situation. As shown in Minbashian et al. (2010), managers' tendency to elevate their state conscientiousness when dealing with difficult tasks can be used to predict AP in a dynamic task environment. Thus, once the predominant feature of an AP context is identified, researchers can start to assess the relevant situational-contingency. Take the following hypothetical scenario for example: let us assume that an AP context is accentuated by uncertainty due to frequent unanticipated changes, and further assume that high state openness will facilitate problem-solving and promote AP. One possibility is to rely on trait openness as a general predictor. The alternative, following the discussion thus far, is to assess each person's contingency between uncertainty and state openness. That is, in such uncertain situations, individuals who tend to behave in a more creative and curious manner are more likely to adapt well.

In addition to examining the situational-contingency of state expressions of traits, our understanding of trait effects on AP may be enhanced by examining traits that specifically focus on flexibility across situations. For example, DeRue, Ashford, and Myers (2012, p. 262–263) define learning agility as 'the ability to come up to speed quickly in one's understanding of a situation and move across ideas flexibly in service of learning both within and across experiences'. Learning agility is posited to involve dispositional tendencies to engage in a number of cognitive (e.g., cognitive simulations, counterfactual thinking, pattern recognition, etc.) and behavioral (e.g., feedback seeking, experimentation, reflection, etc.) processes that directly influence one's ability to learn from previous experiences and develop 'different, more appropriate, and possibly counterintuitive ways of doing things' (LePine et al., 2000, p. 570). Given this, future research examining the role of learning agility and similar constructs in predicting both the rate and levels (cf. DeRue et al., 2012) of AP seems warranted.

To better understand the person's complex cognition, volition, and emotion when interacting with and performing in the dynamic work environment, researchers can start to model AP with closer precision. For example, experience-sampling of workers who undergo work transitions allows multiple snapshots of AP processes in real time, and thus may offer valuable insight to the dynamic interaction between the person and the perceived change in work environment. For changes that occur over a longer period of time, the use of multiple waves of measurements over time enables the study of changes in both the person and the work environment. These research methods, together with advanced statistical techniques that allow for modeling of complex pattern of changes over time (see Lang & Bliese, 2009 for an

example), can further illuminate the psychological mechanisms underlying AP.

CONCLUSION

In this chapter, we provided a critical review of research stemming from the two key paradigms of research on adaptive performance (AP), and offered an attempt to integrate the AP literature with several related research areas. We reiterate the need to better understand the AP context and to characterize the dynamic interplay between the person and the changing work context. Research on AP holds great potential to promote worker adjustment and improve organizational effectiveness in the age of rapid change. We hope this chapter offers practitioners and organizations actionable insights regarding evidence-based approaches to improve workforce's AP. We also encourage scholars to grasp the research opportunities presented in this chapter to further advance the cumulated knowledge on AP.

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Political Effectiveness at Work

Jo Silvester and Madeleine Wyatt

INTRODUCTION

‘Politics at work’ is a term that most employees associate with colleagues and managers engaging in Machiavellian behavior, or operating outside accepted organizational procedures to achieve self-serving ends. For most people workplace politics relates to the darker side of organizational behavior; something that needs to be avoided or removed if we are to achieve healthy, efficient, and productive places of work (Buchanan, 2008; Mintzberg, 1983). But industrial, work, and organizational (IWO) psychologists have paid far less consideration to the counter view: that organizations are inherently political, and that political behavior is a natural and endemic feature of work environments, resulting from competing views about how work should be performed, the goals to be achieved, and the conflicting needs of individuals, groups, and organizational functions. According to this perspective workers must develop an understanding of their political environment, and the skills to navigate it, in order to wield power effectively and progress to senior levels (Dawson, 1986; Doldor, 2014; Ellen, 2014; Pfeffer, 1981, 2010).

Yet, IWO-psychologists may not be alone. In a database search of ‘political effectiveness’ targeting IWO-psychology journals and journals from

management, political science, and sociology (using PsychINFO and Web of Knowledge respectively), we found remarkably few articles. The articles that were generated mostly discussed the effectiveness of corporate-level and national-level political strategies, and the remainder discussed political skill as a social effectiveness construct.¹ Significantly, no papers were found examining the broader concept of individual-level political effectiveness at work.

The focus of this chapter is therefore to refocus attention on the questions ‘what is individual-level political effectiveness?’ and ‘how is it developed?’ Defining political effectiveness as ‘the ability to understand and navigate political work environments, in order to acquire power, influence others, and achieve political goals’ we review the existing IWO-psychology literature on organizational politics, and examine why the discipline has such a conflicted relationship with politics at work (i.e., why researchers conceptualize political behavior as ‘good’ or ‘bad’ – not both). We discuss how studying politicians could afford valuable insight into the nature of political work and inform a broader understanding of how political effectiveness is developed. Finally, we outline a model of the likely antecedents and processes of political effectiveness, and identify future directions for research and practice in this area.

POLITICIANS AND POLITICAL WORK

Before we review the literature it is worth explaining why we became interested in political effectiveness, because this interest began in 2001 with an unexpected and somewhat unusual request from the Director of Candidates of a British political party. Having read of our work on diversity and employee selection in a national newspaper, she wrote to ask whether it would be possible to discuss how best practice from employee recruitment might be used to create a fair and robust process for identifying prospective Parliamentary candidates with potential to become good Members of Parliament (MPs) (Silvester, 2012; Silvester & Dykes, 2007).

The US alone has more than one million roles occupied by elected leaders who play an important role in ensuring economic and social well-being. Until now, however, IWO-psychologists have paid surprisingly little attention to politicians or political work, and hardly anything is known about the knowledge, skills, and abilities (KSAs) required to perform political roles, nor how these can be developed (Silvester, 2008). In fairness, politicians are elected to office, not selected or appointed, and research and practice on employee recruitment might not seem immediately relevant. But, intra-party candidate selection (i.e., how legislators gain permission to use a party's banner) is one of the most important functions performed by a political organization (Katz, 2001; Shomer, 2014); particularly in parliamentary systems of government where political parties exert considerable control over who is allowed to be a political candidate (Norris, Carty, Erikson, Lovenduski, & Simms, 1990). In fact most political parties in Britain and other Western democracies² have at least one selection process where prospective candidates are judged according to whether they are thought to possess the qualities needed to become a good MP. Yet, party approval procedures are often referred to as the 'secret garden of politics' because so little is known about the criteria used by political parties to judge prospective candidates (Gallagher & Marsh, 1988).

In what proved to be the first of several projects investigating political roles (e.g., Silvester, 2006; Silvester, 2012; Silvester, Wyatt, & Randall, 2014), we worked with the Director of Candidates to develop a multi-trait multi-method assessment center. This involved conducting a role analysis to identify competences and behavioral indicators for the MP role, designing a series of role-related exercises, and training assessors (i.e., MPs and Party volunteers) to evaluate prospective candidates using the same agreed criteria. A subsequent validation study found that critical thinking

and communication skill predicted the percentage of votes and percentage vote swing achieved by parliamentary candidates fighting seats in the British 2005 general election (Silvester & Dykes, 2007).

This and subsequent projects have provided a unique opportunity to study politicians at work, and we are convinced that IWO-psychology as a discipline could contribute much in terms of broadening academic and public understanding of political roles, and how politicians and candidates can be better supported. Nevertheless, the work has also challenged our assumptions about political behavior; rather than viewing political behavior as deviant and problematic, we would argue that *politics is work for politicians* and therefore political effectiveness is important for both the performance of those elected to office and to democracy as a whole. Moreover, it is equally plausible that IWO-psychologists could learn much by studying politicians at work. Therefore in this chapter we draw on these experiences to theorize about the meaning of political effectiveness in the workplace, and to how it can be developed. We begin by examining how existing IWO-psychology research typically fits one of two views: political behavior as 'bad' or political behavior as 'good'.

POLITICAL EFFECTIVENESS AND IWO-PSYCHOLOGY

IWO-psychology has a conflicted relationship with political behavior in the workplace. Most research falls into one of two broad categories: the first conceptualizes political behavior as an illegitimate activity that is essentially 'bad' for employees and organizations, while the second considers it core to social influence, and necessary for operating successfully in ambiguous and competitive work environments. Very little IWO-psychology research discusses political behavior as a socially constructed and contested phenomenon, where the same action can be perceived as good, bad, or neutral depending on whose perspective is taken and whether the behavior serves to benefit or disadvantage them.

Politics as 'Bad'

For most people, the popular conception of politics at work is one of individuals engaging in 'back-stabbing' and devious Machiavellian behavior in order to undermine colleagues, get ahead,

and achieve personal objectives (Buchanan, 2008; Provis, 2006). Pettigrew (1973), for example, describes company politics as the by-play that occurs when a person or group wishes to advance themselves or their ideas regardless of whether this is likely to help the organization or their colleagues. In an effort to identify the types of behavior people are most likely to describe as political, Gandz and Murray (1980) asked 428 managers to write accounts of political incidents that they had experienced or observed at work. Most of these narratives described episodes of self-serving and self-advancing behavior by colleagues and managers; typically involving decisions about promotions, transfers, demotions, or dismissals that were perceived as unfair or based on hidden criteria. Also common were descriptions of colleagues avoiding blame, supervisors focused on protecting their own position, and competition between work units for control over projects or resources. Based on these findings, Gandz and Murray defined organizational politics as 'a subjective state in which organizational members perceive themselves or others as intentionally seeking selfish ends in an organizational context when such ends are opposed to those of others' (1980, p. 248).

The idea of political behavior as pursuit of self-interest to the detriment of others has persisted (e.g., Byrne, Kacmar, Stoner, & Hochwarter, 2005; Cropanzano, Kacmar, & Bozeman, 1995; Silvester, 2008; Treadway, 2012), generating a large body of research concerned with the negative affective, motivational, and behavioral consequences for employees who perceive their workplace to be political. Defined as 'an individual's subjective evaluation about the extent to which the work environment is characterized by co-workers and supervisors who demonstrate such self-serving behavior' (Ferris, Harrell-Cook, & Dulebohn, 2000, p. 90), perceptions of organizational politics (POP) are considered to act as a work stressor that leads employees to experience strain, lowered job satisfaction, and higher levels of turnover. In their pivotal article 'Politics in organizations', Ferris, Russ, and Fandt (1989) propose a conceptual framework of the organizational (i.e., workplace formalization, hierarchical level, and span of control), role (i.e., job autonomy, feedback), and individual antecedents of POP (e.g., employee age, sex, Machiavellianism, and self-monitoring ability). Three subsequent decades of research has provided good support for the model, with moderate to high relationships between POP and job anxiety, fatigue, helplessness and burnout, turnover intentions, commitment, and job performance (e.g., Bedi & Schat; 2013; Brouer, Ferris, Hochwarter, Laird, & Gilmore, 2006; Chang, Rosen, & Levy, 2009; Ferris, Adams, Kolodinsky, Hochwarter, &

Ammeter, 2002; Miller, Rutherford, & Kolodinsky, 2008; Perrewé, Rosen, & Maslach, 2012; Randall, Cropanzano, Bormann, & Birjulin, 1999; Rosen, Levy, & Hall, 2006; Vigoda, 2002). Taken together these studies support the contention that political behavior at work is bad for individual and ultimately organizational performance.

Politics as 'Good'

According to the second perspective, however, political behavior is not only a natural and endemic feature of organizational life, it is a required competence in most job roles where incumbents are expected to persuade and influence others, and negotiate between competing demands. Much of the IWO-psychology research on political behavior has strong roots in social influence theory (Ferris & Treadway, 2012). Although social influence tactics are not typically described as 'political' they do involve individuals using personal power to persuade another person or group to act or think in particular ways (e.g., Bolino, Kacmar, Turnley, & Gilstrap, 2008; Gardner & Martinko, 1988; Turnley & Bolino, 2001; Wayne & Liden, 1995). In his early work, Jones (1964) identifies three forms of ingratiation tactics used by employees to influence their managers: *other-enhancement* tactics such as 'flattery', *self-presentation* tactics including smiling, rendering favors or 'false modesty', and *opinion conformity* tactics like voicing opinions or beliefs similar to those of the target person. Eight social influence tactics are identified by Kipnis, Schmidt, and Wilkinson (1980), including acting assertively, ingratiating oneself, using rational arguments, imposing sanctions, offering an exchange, making upward appeals, blocking the activities of others, and forming coalitions. Dulebohn and Ferris (1999) make a further differentiation between *supervisor-focused* tactics like praising a manager's accomplishments, volunteering help, or performing extra-role tasks, and *job-focused* tactics such as working harder in the presence of managers or making them aware of personal accomplishments. Studies show that effective use of social influence has a positive impact on many different work-related outcomes, including appraisal ratings (Bolino, Varela, Bande, & Turnley, 2006; Dulebohn & Ferris, 1999; Judge & Ferris, 1993; Wayne & Liden, 1995; Wayne, Liden, Graf, & Ferris, 1997), promotion (Sibunruang, Capezio, & Restubog, 2013; Thacker & Wayne, 1995; Wayne et al., 1997), salary level (Gould & Penley, 1984; Wayne et al., 1997), and career success (Judge & Bretz, 1994; Westphal & Stern, 2006). A meta-analysis by Higgins, Judge, and Ferris (2003) has also found that employee

ingratiation and rationality have the most positive influence on managers' performance assessments.

However, political skill is the social effectiveness construct that has received most attention from researchers over recent years. Defined as the 'ability to effectively understand others at work and to use such knowledge to influence others to act in ways that enhance one's personal and/or organizational objectives' (Ferris, Treadway, Kolodinsky, Hochwarter, Kacmar, Douglas, & Frink, 2005, p. 127), political skill explicitly recognizes social influence as a political activity and that individuals vary in their ability to influence others and achieve goals. Political skill is also distinct from other forms of social effectiveness like emotional intelligence, because it comprises a set of social competencies that enable individuals to influence social situations, acquire organizational knowledge and resources, and build power (Ferris, Treadway, Perrewé, Brouer, Douglas, & Lux, 2007). These are *social astuteness* – a person's ability to accurately interpret social interactions and understand their own and others' motivations and behavior; *interpersonal influence* – the ability to persuade and influence others across different situations; *networking ability* – an ability to develop and leverage diverse networks and coalitions at work to generate opportunities and secure resources, and; *apparent sincerity* – the ability to appear trustful, authentic, and genuine (Ferris et al., 2005).

A growing body of research, most of which has used the 18-item Political Skill Inventory (PSI: Ferris et al., 2005), has found that political skill is positively associated with many different work-related outcomes (Munyon, Summers, Thompson, & Ferris, 2015; Treadway, Hochwarter, Ferris, Kacmar, Douglas, Ammeter, & Buckley, 2004), including leadership effectiveness (Brouer, Douglas, Treadway, & Ferris, 2013; Douglas & Ammeter, 2004), job performance (Blickle, Meurs, Zettler, Solga, Noethen, Kramer, & Ferris, 2008; Jawahar, Meurs, Ferris, & Hochwarter, 2008; Semadar, Robins, & Ferris, 2006), reputation (Blass & Ferris, 2007; Blickle, Schneider, Liu, & Ferris, 2011), income, hierarchical status, and satisfaction (Todd, Harris, Harris, & Wheeler, 2009)³. Silvester et al. (2014) also found that political skill predicted 360-degree performance ratings for politicians provided by their political colleagues and appointed officials.

Political skill is explored further in Chapter 11, but of particular interest here is the finding that political skill moderates the perception and effects of organizational politics and role conflict, with politically-skilled individuals less likely to experience negative consequences of POP (Brouer, Harris, & Kacmar, 2011; Perrewé, Zellars, Ferris, Rossi, Kacmar, & Ralston, 2004). One explanation is

that politically-skilled individuals are better able to understand and react to political environments and therefore experience a greater sense of power and control. Shaughnessy, Treadway, Breland, Williams, and Brouer (2011), for example, found that politically-skilled female employees could adapt their influence tactics to avoid gender role expectations that constrain the effectiveness of influence behavior for women, leading them to be rated more likeable and promotable. Thus, taken together, these findings provide strong evidence that political behavior is good for individuals and organizations.

A QUESTION OF LEGITIMACY

These contradictory views of political behavior as good or bad in IWO-psychology can be explained in part by considering whose perspective the researchers have taken in the studies and whether the political activity serves to benefit or disadvantage those individuals or groups (Lepisto & Pratt, 2012). For example, POP research is mostly concerned with how employees at lower organizational levels perceive the political behavior of senior and more powerful actors, while political skill research is typically focused on managers in more senior roles. It is very likely that less powerful junior employees feel more threatened by political activity by powerful others because it has greater potential to disadvantage them, while more powerful senior organizational members may well tolerate or even encourage political behavior among managers if they believe it will benefit company (or indeed their own) interests. Certainly, evidence suggests that managers view political behavior as a normal, expected, and legitimate part of their role (e.g., Buchanan, 2008; Gandz & Murray, 1980).

Similar conflicted views of political behavior can also be found in researchers' definitions of political behavior (see Table 8.1). One of the most common features is a reference to political behavior being driven primarily by self-interest (i.e., 12 out of 19 definitions listed). Eight definitions also refer explicitly to negative consequences for organizations (e.g., producing conflict and disharmony, being divisive, or a disregard for organizational interests). Only Ferris, Fedor, and King (1994) describe political behavior as an activity where individuals manage or shape meaning for others, alluding to political outcomes as socially constructed and therefore dependent as much on the observer's viewpoint as the actions of political actors.

Importantly, however, six definitions refer to political behavior as illegitimate or unsanctioned. For example, Mayes and Allen define

Table 8.1 Definitions of political behavior at work

<i>Source</i>	<i>Definition of political behavior</i>
Pettigrew (1973, p. 17)	Behavior by individuals, or in collective terms by subunits, within an organization that makes a claim about the resource-sharing system of the organization.
Mayes and Allen (1977, p. 675)	The management of influence to obtain ends not sanctioned by the organization or to obtain sanctioned ends through non-sanctioned influence means.
Tushman (1977, p. 207)	The structure and process of the use of authority and power to effect definitions of goals, directions, and other major parameters of the organization.
Allen, Madison, Porter, Renwick, and Mayes (1979, p. 77)	Intentional acts of influence to enhance or protect the self-interest of individuals or groups.
Gandz and Murray (1980, p. 248)	Self-serving behavior [that is] a deviation from technoeconomic rationality in decision-making.
Bacharach and Lawler (1980, p. 1)	The tactical use of power to retain or obtain control of real or symbolic resources.
Pfeffer (1981, p. 7)	Activities taken within organizations to acquire, develop, and use power and other resources to obtain one's preferred outcomes in a situation in which there is uncertainty or dissensus about choices.
Mintzberg (1983, p. 172)	Individual or group behavior that is informal, ostensibly parochial, typically divisive, and, above all, in the technical sense, illegitimate – sanctioned not by formal authority, accepted ideology, or certified expertise.
Ferris, Russ, and Fandt (1989, p. 145)	Social influence process in which behavior is strategically designed to maximize short-term or long-term self-interest, which is either consistent with or at the expense of others' interests (where self-interest maximization refers to the attainment of positive outcomes and prevention of negative outcomes).
Ferris, Fedor, and King (1994, p. 4)	The management of shared meaning, which focuses on the subjective evaluation and interpretations of meaning rather than on the view that meanings are inherent, objective properties of situations; from the standpoint of managerial political behavior, the objective is to manage the meaning of situations in such a way as to produce desired, self-serving responses or outcomes.
Ferris, Frink, Bhawuk, Zhou, and Gilmore (1996, p. 26)	Behavior not formally authorized, officially certified, or widely accepted by the organization – efforts to maximize self-interest, perhaps at the expense of others and/or the organization.
Ferris, Frink, Galang, Zhou, Kacmar, and Howard (1996, p. 234)	Behavior not formally sanctioned by the organization, which produces conflict and disharmony in the work environment by pitting individuals and/or groups against one another, or against the organization.
Harrell-Cook, Ferris, and Dulebohn (1999, p. 1094)	Self-serving behavior [involving] tactically assertive behaviors.
Kacmar and Baron (1999, p. 4)	Individuals' actions that are directed toward the goal of furthering their own self-interest without regard for the well-being of others or their organization.
Randall, Cropanzo, Bormann, and Birjulin (1999, p. 161)	Unsanctioned influence attempts that seek to promote self-interest at the expense of organizational goals.

Table 8.1 Definitions of political behavior at work (continued)

<i>Source</i>	<i>Definition of political behavior</i>
Valle and Perrewé (2000, p. 361)	The exercise of tactical influence, which is strategically goal directed, rational, conscious, and intended to promote self-interest, either at the expense of or in support of others' interests.
Hochwarter, Witt, and Kacmar (2000, p. 473)	Behaviors designed to foster self-interest taken without regard to, or at the expense of, organizational goals.
Byrne (2005, p. 176)	Intentional actions (covert or overt) by individuals to promote and protect their self-interest, sometimes at the expense of and without regard for the well-being of others or their organization.
Perrewé, Rosen, and Maslach (2012, p. 215)	A group of activities that are not formally sanctioned by organizations; are associated with attempts to benefit, protect, or enhance self-interest; and are engaged in without regard for the welfare of the organization or its members.

political behavior as 'the management of influence to obtain ends *not sanctioned* by the organization or to obtain sanctioned ends through *non-sanctioned* influence means' (1977, p. 675, italics added). IWO-psychologists have paid far less attention to this defining feature of political behavior, despite the fact that defining political behavior as *illegitimate* or *unauthorized* positions it as an activity that occurs outside, and therefore interferes with, formal human resource management (HRM) systems like recruitment, performance review, and promotion. Importantly, defining political behavior as unauthorized also implies accepting the legitimacy of a formal authority in the organization with power to sanction certain behaviors – and label other behaviors as illegitimate or 'political'.

According to Ferris and Judge (1991), HRM is the organizational function that labors most under assumptions of rationality, even though it is in fact a political system that exists to formalize managers' power and control over employee behavior (Ferris & King, 1991). Founded on scientific principles and evidence-based practice, the discipline of IWO-psychology is naturally aligned with the view that there are legitimate (i.e., sanctioned) and illegitimate (i.e., non-sanctioned) ways to make personnel-related decisions. For example, employee assessment procedures are designed on the premise that decision-making is more accurate and fair if transparent, standardized procedures are used, and raters are trained to apply agreed assessment criteria (Ferris et al., 1996; Gioia & Longenecker, 1994; Levy & Williams, 2004). Scientific methods are also used to evaluate whether these selection procedures predict subsequent work performance. Yet, IWO-psychologists rarely question the authority

and power of management to define good and poor performance; or that managers' ratings feature as the predominant outcome measure for assessing recruitment validity (Arvey & Murphy, 1998). As such IWO-psychologists also align themselves with management interests by creating the formal 'legitimate' HRM systems that shape, control, and reward workplace behavior.

This conflation of managerial and scientific legitimacy makes it very difficult for IWO-psychologists to question their own role as political actors, to accommodate pluralistic views about what constitutes good and poor work performance, or question assumptions about legitimate and illegitimate behavior in organizations.⁴ In fact the de-legitimization of political behavior becomes a control mechanism in itself (Doldor, 2014), because as Butcher and Clarke (2002) argue 'the value placed on unity within any organization renders the process through which democracy is enacted – politics – illegitimate' (pp. 38–39). More importantly, it follows that, by defining behavior that deviates from sanctioned HRM procedures as political, and presenting IWO-psychology procedures (e.g., standardized assessment) as an 'antidote' to political behavior, the very concept of '*political effectiveness*' becomes problematic for the discipline, because it implies successful use of unsanctioned methods to bypass legitimate procedures.

THE POLITICS OF IWO-PSYCHOLOGY

To date, very few studies have considered the political nature of IWO-psychology practice; two notable exceptions are studies of political behavior

in performance appraisal and recruitment settings by Longenecker, Sims, and Gioia (1987) and Bozionelos (2005). In their study, Longenecker et al. originally set out to investigate executives' cognitive processes when judging subordinate performance, but they were struck by the number of times interviewees described deliberately manipulating appraisal procedures for political gain. As a consequence they refocused the research to look at appraisal as a political activity. They found that executives nearly always took political considerations into account when appraising direct reports: they described being mindful of the day-to-day relationship they had with a person, and that the appraisal resulted in a formal and therefore permanent written document that could have important consequences for the individual's ability to advance. Political manipulation also increased if more senior members of the organization appeared to engage in political tactics or treat appraisal as a bureaucratic rather than necessary procedure. Longenecker et al. (1987, p. 184) conclude that executives *'have ulterior motives and purposes that supersede the mundane concern with rating accuracy'*, that appraisals *'take place in an organizational environment that is anything but completely rational, straightforward, or dispassionate'* and that the efforts of IWO-psychologists to conceptualize performance appraisal solely in terms of managers objectively, reliably, and accurately assessing employee behavior are likely to fail as *'accuracy does not seem to matter to managers quite so much as discretion, effectiveness or, more importantly, survival'*.

Similarly, Bozionelos (2005) describes the political nature of an academic appointment procedure where, far from concentrating on explicit selection criteria, interview panel members who belonged to different organizational and academic power networks lobbied actively for the candidates whose backgrounds and interests were most similar to their own. Bozionelos argues that political activity is a normal yet neglected feature of most recruitment procedures. Yet, while IWO-psychologists routinely encounter political behavior in selection, it is usually treated as 'noise' or a source of error to be minimized using scientific procedures, rather than an important activity deserving attention in its own right (Silvester, Anderson-Gough, Anderson, & Mohammed, 2002).

A third area of research with links to issues of legitimacy and therefore political behavior is that concerned with counterproductive work behavior (CWB). Defined by Gruys and Sackett (2003, p. 30) as *'intentional/volitional behavior enacted by employees and viewed by the organization as contrary to its legitimate interests'* a substantial body of research has investigated 'undesirable'

behaviors like rule-bending, disobedience, misconduct, wrong-doing, and deviance. The concept has also been extended to include counterproductive leader behavior (CLB), which Jackson and Ones (2007, p. 114) define as *'behavior enacted by leaders that involves misuse of position or authority for personal and/or organizational benefit'*. Some of these behaviors are very similar to behaviors described as political in the organizational politics literature. Notably, both CWB and CLB define undesirable behavior in terms of what is good for the organization and achievement of organizational goals, suggesting an uncontested view of 'good behavior'. But, depending on the perspective of the observer and whether the outcome disadvantages or benefits them, many behaviors cited (e.g., hiding information, breaking promises, favoritism, and misuse of power) could easily be relabeled selective disclosure of information, reframing agreements, patronage, or acting with authority.

Likewise, organizational citizenship behaviors, such as volunteering for extra work assignments, helping co-workers learn new skills or offering suggestions to improve how work is done, are all considered positive and legitimate because they are aligned with organizations' goals (Spector & Fox, 2010). Yet these behaviors could also be construed as political tactics (e.g., impression management and reputation building: Bolino, Klotz, Turnley, & Harvey, 2013; Klotz & Bolino, 2013), with the potential to cause unfavorable reactions in observers who attribute them to self-enhancement and egoistic motives (Cheung, Peng, & Wong, 2014; Eastman, 1994).

While IWO-psychologists have generally neglected the existence of conflicting viewpoints about how work should be performed, or competition between resources and actors, politicians and political work are a powerful reminder that politics exists precisely because conflict is a normal feature of organizational life. Therefore we argue that political effectiveness, which involves negotiating consensus, persuading others, mobilizing support, and using power to achieve objectives, should be an important focus for IWO-psychology research and practice.

REFLECTIONS ON POLITICAL WORK

It is worth reflecting on political work at this point, because it could provide important insight into the nature of political effectiveness and how it is developed. The term 'politics' originates in Ancient Greece. Derived from πολιτικός (*politikos*), which means 'of, for, or relating to citizens': a broader

meaning concerns the practice, or theory, of influencing others in contexts of governance. Of particular significance here is that politics *is* work for politicians, and therefore political effectiveness is fundamental to democracy and good government. Unlike business where unsanctioned behavior is perceived as a threat to a powerful majority capable of undermining the achievement of business objectives, politics exists in government settings to address, and potentially resolve, conflicting views about what is important and what actions should be taken. As such democracies recognize the legitimacy of pluralistic views, whereas in business the views of a particular group (i.e., management) dominate, and (political) behavior by out-group members is seen as a *cause* of conflict, because it threatens the formal hierarchies and procedures that enforce in-group power.

There are certainly differences between political and traditional job roles: in democratic governments, for example, individuals are elected to leadership roles where they are expected to represent and take decisions on behalf of citizens. Politicians therefore have the legitimate power (i.e., derived from their elected status) to decide how they will perform their roles and respond to constituents' needs (March & Olsen, 1999; Morrell & Hartley, 2006). While the power of a politician is held in check by periodic elections (i.e., when the public can decide whether he or she should be returned to power) there are very few formal procedures that define or constrain how political roles should be performed. So, unlike business, where performance criteria are usually explicit and enforced via HRM procedures, politicians have considerable freedom to decide how they will act, albeit needing to be mindful of public views if they wish to be re-elected.

Importantly, because there are no proscribed definitions of 'good' and 'poor' performance, and because different stakeholders have different views about what a politician should do in office, political performance is a contested construct. Thus a politician can be *judged* good, bad, or both depending on how the observer believes the elected representative *should* enact their role (Silvester et al., 2014). In order to be effective politicians must be able to navigate this contested environment by understanding opposing views, developing a political vision, mobilizing support, and building consensus around specific actions to achieve goals.

In reality, there are more similarities between the job demands of political roles and those of business leaders. Both roles involve understanding and resolving conflict between the different interest groups. Business leaders, for example, have to tread a careful path between the views of different

stakeholders like shareholders, boards of directors, employees, and senior directors. Leadership work, like political work, means representing different interests/constituencies, aligning agendas, and operating in ambiguous environments. Consequently, political effectiveness for business and political leaders is likely to mean learning how to manage perceptions and create meaning for others (Ferris et al., 1994). At times this may involve engaging in the 'darker' aspects of organizational behavior, with political effectiveness the ability to do so while preserving a positive public reputation of competence and trustworthiness.

SUMMARY OF IWO-PSYCHOLOGY RESEARCH

While a significant amount of IWO-psychology research has examined politics in the workplace, studies broadly divide into those conceptualizing politics as 'bad', and those that regard it as a neutral or 'good' characteristic of organizational life. A salient issue is therefore how IWO-psychology works to acknowledge these conflicting views of political behavior. We argue that much can be learnt by studying politicians at work – where conflicting judgments of what constitutes good political performance are constantly in flux, and that IWO-psychologists need to be more reflective of their political role in determining what constitutes legitimate or illegitimate organizational behavior. In order to facilitate further IWO-psychology research and practice, the following section describes a model of political effectiveness that can apply to both political and more traditional work roles.

A MODEL OF POLITICAL EFFECTIVENESS

Building on existing IWO-psychology research, this model theorizes likely antecedents and mechanisms by which individuals develop political effectiveness (Figure 8.1). We define political effectiveness as 'the ability to successfully navigate political environments at work in order to acquire power, influence others, and achieve political goals', and suggest that political effectiveness depends, first, on an individual's propensity to engage in political behavior, and that this will be influenced by organizational and individual factors. Propensity to engage in political behavior will, in turn, influence and guide a political actors' sense-making and learning in relation

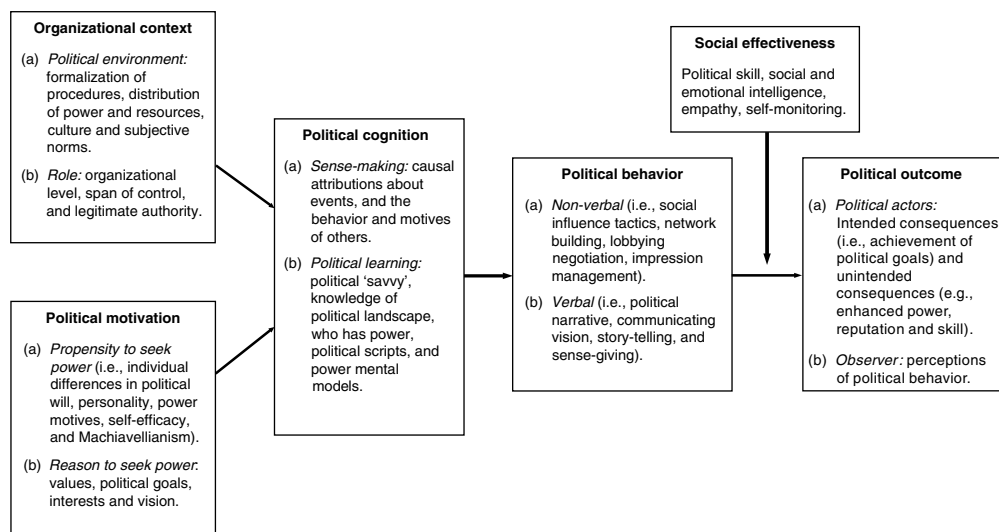


Figure 8.1 A model of political effectiveness

to their political environment, and this in turn will impact on choice of political behavior. We also propose that social effectiveness will moderate the effectiveness of political behavior in producing desired political outcomes.

Organizational Context

There is broad agreement that the organizational context influences both the need for political actors to engage in political activity and the types of political behavior likely to achieve desired outcomes. Our model follows Ferris et al. (1989) in differentiating between two aspects of organizational context, namely the *political environment* (i.e., defined here in terms of organizational structure, formalization, and the distribution of power and resources), and *role* factors (i.e., the type of work performed by an individual, their level in the organizational hierarchy and control over resources).

Organizations vary in terms of structure, rules, formalization of decision procedures, and the social norms that guide accepted behavior (Ammeter, Douglas, Gardner, Hochwarter, & Ferris, 2002). These impact on the form and prevalence of political behavior (Ashforth & Anand, 2003; James, 2006). Typically, political activity is more prevalent in organizational environments typified by ambiguity, and low levels of formalization or adherence to rules about how people should behave. Political organizations often have few restrictions or formal procedures to guide how people behave, and

a lack of formal hierarchy means that individuals have more need to engage in political activity and develop political effectiveness in order to navigate less structured and transparent environments and procedures. Research has also shown that employees are more likely to participate in political behavior if it is seen to be rewarded by managers (Ferris & Judge, 1991), whereas increased accountability to superiors reduces the likelihood of political behavior (Breaux, Munyon, Hochwarter, & Ferris, 2009; Tetlock, Skitka, & Boettger, 1989). Moreover, group and organizational culture have been found to influence individual political action via subjective norms about what constitutes appropriate and inappropriate behavior (Ashford, Rothbard, Piderit, & Dutton, 1998).

The type of role occupied by an individual is also important. For example, span of managerial authority is positively associated with propensity to engage in political behavior, and individuals in boundary-spanning roles are also more often required to understand and engage in political activity (Ammeter et al., 2002). Similarly, roles undertaken by knowledge workers, organizational consultants, and change agents all involve dealing with multiple groups, conflicting interests, and fluid work environments, resulting in a need for higher levels of political ability (Alvesson, 2001; Buchanan & Badham, 2008; Empson, Cleaver, & Allen, 2013). Therefore, the need and opportunity for individuals to develop political ability will depend both on the nature of the organizational environment and the type and level of role they occupy.

Political Motivation

There is a long history of interest in psychological characteristics associated with political behavior, much of which originates in the aftermath of World War II when researchers sought to identify personality constructs associated with motivation to seek and retain power (Adorno, Frenkel-Brunswick, Levinson, & Sanford, 1950; Christie & Geis, 1970). Studies have explored predictors of political behavior at work (e.g., Machiavellianism: Biberman, 1985; Drory & Gluskinos, 1980; Grams & Rogers, 1990; O'Boyle, Forsyth, Banks, & McDaniel, 2012; Pandey 1981), and among political elites (Deluga, 2001; Dietrich, Lasley, Mondak, Rempel, & Turner, 2012; Silvester et al., 2014; Simonton, 1998; Winter, 1987). However, much of this work concerns individuals' *motivation* to engage in political activity. As Mintzberg (1985) argues, individuals need both political *will* and political *skill* to achieve their aims. Therefore in our model we draw on the concept of political will defined by Treadway, Hochwarter, Kacmar, and Ferris (2005, p. 231) as an 'actor's willingness to expend energy in pursuit of political goals (which is) an essential precursor to engaging in political behavior'. This definition incorporates both the 'willingness' to engage, and possession of political 'goals', and we differentiate in a similar way between an individual's *propensity to seek power* (i.e., the psychological characteristics influencing an actor's likelihood of expending energy or effort to achieve power), and their *reason to seek power* (i.e., the values, needs, or desires that mean effort will be directed toward specific goals).

There is good evidence that psychological characteristics differentially impact on an individual's *propensity to seek power*. For example, McClelland (1985) identifies several power motives (i.e., need for Power, need for Affiliation, and need for Achievement) that influence how likely people are to seek to influence others. Treadway et al. (2005) also show that intrinsic motivation and need for achievement is positively associated with employee political behavior in a range of occupations. Much less well understood are factors associated with '*reason to seek power*'. For the most part political actors are often wary of divulging political aims (i.e., what they want to achieve by engaging in political activity) and for good reason – being explicit provides others with information that can be used to undermine the actor. Politicians may be similarly wary of sharing certain personal aims, but they are expected to communicate their political values and vision as part of their manifesto during political campaigning (Silvester, 2012). These public aims may therefore provide an important source of information about 'reason to seek power' and political effectiveness.

Political Cognition

Political actors must be able to recognize, understand, and interpret the events and behavior they encounter to navigate political environments successfully. Political cognition therefore involves making sense of the political landscape in order to decide what or who needs to be influenced and how. Researchers have paid relatively little attention to cognitive precursors of political effectiveness (Ammeter et al., 2002), and in this model we differentiate between: *sense-making*, defined as an actor's on going efforts to understand and explain events in their political environment, and *political learning*, which relates to a political actor's acquisition and storage of knowledge about the political landscape such as where power is held and how it is wielded.

Although sense-making and political learning are likely to be interdependent, sense-making involves a conscious episodic and reactive process that is generally triggered by specific events or behavior. In contrast we construe political learning as more concerned with the development of procedural knowledge, and cognitive scripts stored in long-term memory. Thus political learning occurs over time, and with experience, as individuals acquire knowledge about their environment and the political tactics and strategies likely to be effective in different situations. Together these two aspects of political cognition form an individual's political expertise. Whilst limited, existing work does suggest that learning about the wider political context has a positive impact on the acquisition of political skill and leader reputation (Blass & Ferris, 2007), and there is also evidence of positive association between political knowledge, salary progression, and career satisfaction (Blass, Brouer, Perrewé, & Ferris, 2007; Seibert, Kraimer, & Crant, 2001).

Political Behavior

Many attempts have been made to describe and define political behavior. Lepisto and Pratt (2012), for example, distinguish between short-term 'tactical', long-term 'strategic', proactive 'assertive', and reactive 'defensive' forms of political behavior. In this model we focus on observable behavior, and differentiate between non-verbal (i.e., actions, expressions) and verbal (i.e., spoken or written) forms of behavior that can be used by actors to change others' views, mobilize support, or undermine opponents. A substantial body of IWO-psychology research focuses on social influence tactics (e.g., negotiating, alliance building, lobbying and networking: Anderson & Kilduff, 2009), and self-serving and group-serving behavior

(Cheng, Tracy, Foulsham, Kingstone, & Heinrich, 2012). Research has also investigated the impact of power on stereotyping, hubris, and individual decision-making (Anderson & Berdahl, 2002; Fiske, 1993).

There has been less focus on how political actors use communication to shape meaning for others in order to achieve desired aims. Ferris et al.'s (1994) definition of political behavior as the 'management of shared meaning' (see Table 8.1), adopts a social constructionist perspective whereby actors use communication to proactively manage how others interpret and understand situations, and events. This is also illustrated in the use of storytelling, narratives, and persuasive communication to convey political vision and to shape a collective identity based on shared values and purpose (Humphreys & Brown, 2002; Silvester, Anderson & Patterson, 1999). Politicians are well aware of the importance of communication in achieving influence (e.g., Bull, 2008; Silvester et al., 2014), but scholars have also become increasingly interested in how individuals use communication at work to develop a strong public identity and reputation to enhance their power, build consensus, and achieve political aims (Grant, Hardy, Oswick, & Putnam, 2004). Thus, communication is included here as a mechanism of 'sense-giving' that enables political actors to create a shared understanding about the importance of particular actions, and we suggest that future research might focus more explicitly on the use of language to achieve political goals.

Social Effectiveness

The impact of political behavior will depend in part on an individual's social effectiveness. Political actors must be flexible in adapting their behavior to meet the needs and interests of different people or groups being targeted, therefore, political effectiveness requires that an actor is both sensitive to others' needs and skilled in knowing how best to adapt their response (Treadway, Breland, Williams, Cho, Yang, & Ferris, 2013). There is considerable evidence that individual characteristics like emotional and social intelligence, self-monitoring, and empathy, sensitize individuals to political targets, increasing the likelihood of effective political behavior (Ammeter et al., 2002; Fandt & Ferris, 1990; Harris, Kacmar, Zivnuska, & Shaw, 2007; McClelland, 1985). For example, empathic individuals are perceived as more trustworthy (Silvester, Patterson, Koczwara, & Ferguson, 2007), and the ability to empathize has been identified as a key trait for political leaders by voters (Deluga, 2001). Likewise, increased social awareness and

self-monitoring have been shown to moderate the effectiveness of political behavior because they reduce the likelihood of political actors engaging in stereotyping or demonstrating hubris as their power increases (Kipnis, 1976; Fiske, 1993).

Of particular importance here is the social effectiveness construct – political skill. This includes dimensions of 'social astuteness' and 'apparent sincerity', and individuals who are high on political skill are more sensitive to the actions and interests of others and better able to adapt their political behavior to present as sincere and genuine (Ferris et al., 2005). Harris et al. (2007), found that politically-skilled employees were able to use impression management tactics more appropriately in supervisor–subordinate dyads, and this resulted in higher performance evaluations from supervisors. We therefore propose that political skill, together with other social effectiveness constructs such as self-monitoring, empathy, and self-awareness, will moderate the success of political behavior in achieving political goals.

Political Outcome

Although political 'effectiveness' implies the existence of political 'ineffectiveness', measuring political effectiveness is problematic for researchers. Not only do negative perceptions of politics as Machiavellian and/or divisive make it more difficult for researchers to solicit self-evaluations from individuals about achievement of political goals, judgments of effectiveness are likely to vary according to who is evaluating the political behavior and whether it serves their interests. In this model we differentiate between political outcomes as judged by *political actors*, and political outcomes as judged by *observers*. Moreover, the evaluation of political outcomes for political actors can be based both on (i) whether the actor believes he or she has achieved their *intended* political aims (i.e., their *reason for seeking power*), and (ii) the actor's rating of *unintended* outcomes such as perceived changes in reputation or power that results from the political activity (although for the more political astute, these might be one and the same, because some individuals may engage in political behavior solely to enhance their reputation, for example).

Asking observers to judge political outcomes is similarly complicated by the fact that the consequences of political behavior will vary for individuals; as such, different observers may well perceive and evaluate the same behavior in different ways. Thus, at least from the observer's perspective, political effectiveness may not exist

in positivist terms as a single measurable outcome but as a social construct that will vary according to pluralistic viewpoints. This constructivist-interpretivist view of political behavior as something ‘in the eye of the beholder’ presents a challenge to more traditional scientific approaches to measurement found in IWO-psychology. If behavior is ‘political’ only when actors or observers label it as such (Buchanan, 2008), researcher-derived definitions or taxonomies are likely to be of secondary importance to the definitions and interpretations of respondents (Doldor, 2014). Therefore, like political actors who, in order to be politically effective, must be able to understand and take account of contradictory perspectives, researchers must somehow accommodate pluralistic views about political effectiveness and how to assess it. One possibility would be to adapt multi-source feedback to allow exploration of different perspectives, much like Silvester et al. (2014) use 360-degree feedback to capture shared and discrepant views about role performance for politicians.

FUTURE DIRECTIONS

This chapter has built on IWO-psychology research and theory to outline a model that theorizes possible antecedents and mechanisms of political effectiveness, including relationships between the organizational context, individuals’ political motivation, cognition, political behavior, social effectiveness, and political outcomes. Our aim is to provide a framework for future empirical research and practice, and in the next section we focus on a number of key areas where we propose further work is likely to prove worthwhile in understanding and developing political effectiveness.

Political Understanding – Making Sense of Political Environments

We have argued that individuals need to understand the political nature of work environments in order to make sense of the events they observe, the motives of others, and determine the best ways to influence stakeholders. Although we know relatively little about political cognition, work on power mental models and political scripts (Ammeter et al., 2002) is relevant here, because both provide a focus for researchers to investigate the organized mental representations that individuals formulate about their own power and that of others. Defined as memory structures acquired

through experience of previous political activity, researchers suggest that political scripts prompt the development of political strategies, which in turn inform action in new political contexts. Future research investigating the nature of political scripts and power mental models, could draw on qualitative methods like ‘story-telling’ to elicit how politically effective individuals at work, and successful politicians, explain their own political experiences and how their understanding evolved over time (cf, Doldor, Anderson & Vinnicombe, 2013).

The model also identifies political sense-making as important, where political actors monitor their environment to detect and explain events and behavior (i.e., by opponents, supporters, and colleagues) that have potential to affect their power or influence. Attribution theory is relevant here, because it proposes that individuals engage in causal sense-making when they encounter novel, surprising, or potentially threatening events in order to render future events more predictable (Heider, 1958; Wong & Weiner, 1981). Attribution theorists have investigated this sensemaking in relation to many domains, including how individuals react to powerful others and exert authority (e.g., Bugental & Lin, 2001; Kipnis, 2001), but very little is known about how actors attribute causality to political events and how these attributions influence successful political strategies. We therefore suggest that researchers might usefully explore how the political actors engage in attributional activity to explain political activity of others and how their explanations influence their own choice of political behavior.

Developing Political Effectiveness – Practical Support

Popular conceptions of political activity as Machiavellian and divisive make it difficult for organizations to acknowledge that their workplaces are political. As such, it can be challenging to persuade companies to invest in formal development of political effectiveness for employees. These activities are often referred as ‘social influence’ or ‘emotional intelligence’ training to downplay the less palatable ‘political’ aspects for business audiences. Similarly, efforts to provide formal training and development for politicians can also meet with considerable resistance, and surprisingly little formal training is available for aspiring, or incumbent, politicians (Avellaneda, 2009; Silvester, 2008). In two recent studies of new Members of Parliament (MPs) in the UK House of Commons (Fox & Korris, 2012, and the New Zealand House of Representatives

(Cooper-Thomas & Silvester, 2014), the authors found that not only do political candidates receive little information from their political parties about what to expect if elected, MPs receive little if any formal training and development. Newly elected MPs typically receive 1–2 days induction training about how Parliament works, where to find people, and how to use the library; beyond that they must rely on informal socialization practices to learn what is expected of them and how to navigate the ambiguous political environment.

As the development of political effectiveness is treated with such caution in politics and business, it is perhaps not so surprising that few studies have investigated the process (Doldor, 2014; Ferris & Treadway, 2012), however, political skill training, employee socialization, and mentoring have been identified as the methods most likely to aid development of political effectiveness. For example, researchers suggest that political skill is comprised of a set of competencies that can be trained, shaped, and developed using methods such as communication training, drama-based training, and role play (Ferris et al., 2005; Ferris et al., 2000). To date evidence of their success remains limited, as relatively few organizations have implemented political skill training. Researchers have given more consideration to how informal socialization practices and interpersonal relationships develop political knowledge (Chao, O’Leary-Kelly, Wolf, Klein, & Gardner, 1994; Ferris, Bhawuk, Fedor, & Judge, 1995; Lankau & Scandura, 2002; Perrewé & Nelson, 2004; Perrewé, Young, & Blass, 2002). Chao et al. (1994) suggest that a key area of knowledge for organizational newcomers is learning about political norms and behaviors during socialization, and in their longitudinal study of socialization during organizational induction and orientation programs, Kammeyer-Mueller and Wanberg (2003) found that political knowledge was better developed via informal relationships. In contrast, formal training about individuals’ responsibilities, and the organization’s hierarchies and functions increased role clarity for employees. Relationships with leaders were particularly useful as leaders were able to explain how informal and political processes worked, and could introduce newcomers to their own social networks. Mentoring has also been identified as important for developing political effectiveness, with mentors assisting protégés by imparting knowledge about ‘how things really work around here’, and the informal ‘rules of the game’, enabling employees to understand who has power and how influence is wielded (Blass & Ferris, 2007; Ferris et al., 2007; Kram, 1985). Thus, mentoring is more likely to provide individuals with an opportunity to learn about the power dynamics of the organization,

formal and informal relationships between groups, and hidden social norms that guide how peers and superiors engage in political behavior (Blass et al., 2007; Drory, 1993; Ferris et al., 1989).

These findings suggest that organizations need to pay careful consideration to the methods they adopt when aiming to develop political effectiveness. For example, choice of mentor can be important for the development of political effectiveness, with more powerful and senior mentors better positioned to impart knowledge about the political environment and the skills required to navigate it (Blickle, Witzki, & Schneider, 2009; Ragins, 1997). Although it has also been argued that formal mentoring arrangements, those where mentors and protégés are assigned to one another, are less effective than informal mentorships where relationships are more organic and based on mutual identification (Ragins & Cotton, 1999; Underhill, 2006). Similarly, because formal mentors are more visible, they may be more apprehensive about encouraging protégés to engage in political behaviors that may be construed as illegitimate or unsanctioned (Ragins & Cotton, 1999). We suggest that organizations consider the role of mentoring and its various forms for the development of political effectiveness. We also advocate further study of mentoring relationships and socialization processes, to explore how political learning is acquired, could provide important insight into the nature and development of political effectiveness at work.

The Politics of Inclusion – Political Effectiveness and Diversity

A final potential area for future research and practice concerns the differential ability (or power) of individuals and groups to access political knowledge and develop political effectiveness. As we have seen, political knowledge is hard to access, because it is rarely made explicit or included as part of formal training and development activities. Individuals therefore depend on being granted privileged access to hidden information that is only made available to a select few by more senior powerful actors. Researchers have highlighted the predicament of those individuals (e.g., women and minority ethnic employees) who experience more difficulty accessing relationships with senior workers able to impart political knowledge (Blass et al., 2007; Wyatt & Silvester, 2015). For example, employees from minority groups find it more difficult to develop informal mentoring relationships with demographically dissimilar senior organizational members, as white males tend to dominate senior roles in most organizations (McDonald, 2011).

Minority groups may therefore need additional training, and proactive identification of mentoring partners through formal programs, to facilitate the development of political knowledge. At present most IWO-psychology training and development research focuses on transfer of explicit knowledge about formal organizational systems and processes rather than knowledge about informal political processes. As these informal processes often capture ‘the way things are really done around here’ they may in fact contradict the information provided via formal organizational routes. As such, those individuals who are more reliant on formal learning opportunities, and find it difficult to access informal routes, are likely to be disadvantaged in their development of political effectiveness (Wyatt & Silvester, 2015). It is therefore important for future research and practice to examine formal and informal methods of developing political effectiveness, and IWO-psychology practitioners might consider proactive pairing of individuals from minority groups with powerful, politically effective mentors. Organizations also need to consider ways to ensure that members of minority groups have equal access to informal leader support as well as information from formal orientation programs.

SUMMARY FOR IWO PRACTICE

In summary, to support the development of political effectiveness we suggest the following future directions for IWO practice:

- IWO-psychologists should acknowledge that organizations are political and reflect on their own role as political actors in organizational contexts.
- Political effectiveness is a contested construct, therefore researchers and practitioners need to develop methods of assessment that can accommodate multiple and potentially conflicting perspectives.
- More research is needed into the utility of formal training methods in enhancing the development of political knowledge and skill (e.g., drama-based training, communication training, and role play).
- Practitioners should be aware that political information is more likely be transferred via informal relational mechanisms (e.g., leader support), than formal orientation programs, therefore careful consideration should be given to how planned and unplanned socialization activities impact on the development of political knowledge.
- As mentoring is a valuable resource to develop political effectiveness, practitioners should consider the power of mentors, the benefits offered by informal mentorships and of longer-term relationships.
- There is a need for further research to identify the causes of differential access to political information, and to raise awareness of the difficulties that women and minority ethnic employees can experience in their efforts to develop political effectiveness at work.

CONCLUSIONS

The political effectiveness literature reveals a conflicted relationship between IWO-psychology and political behavior at work. IWO-psychologists develop formal systems of selection, assessment, and development that derive from the premise that scientific methods remove ‘noise’, including that associated with illegitimate political behavior, in order to improve the accuracy and fairness of employment decisions. As such, IWO-psychology is often positioned as an ‘antidote’ to political behavior at work. However, very little attention has been paid to the role of IWO-psychologists as political actors. One of our aims in writing this chapter has been to explore often implicit assumptions about political behavior within the discipline, whilst revisiting political effectiveness as an important topic worthy of future study.

In theorizing a model of antecedents and processes associated with political effectiveness, we identify several areas where future research is needed both to facilitate better understanding, and support practical activities to develop political effectiveness in work and politics. That said, there is little doubt that the topic of political effectiveness presents uncomfortable challenges for IWO-psychology researchers and practitioners. For example, if we acknowledge that much of the work of IWO-psychologists involves creating HRM procedures that enhance managers’ power to control employees, does this make the discipline undemocratic? Likewise, given that most assessment methods compare individual performance against behavioral norms defined by managers. And, is it realistic to accommodate pluralistic views about how individuals should behave at work or what constitutes good job performance?

Finally, do we need to acknowledge the importance of the informal and therefore uncontrolled methods by which individuals acquire information to gain power and wield influence at work? How do

we accommodate unsanctioned political behavior if it runs counter to formal systems and, by definition, is perceived as illegitimate? Furthermore, is it possible to be politically effective without engaging in the 'darker' side of Machiavellian political tactics and behavior?

Although IWO-psychology advocates the use of rigorous, transparent, and evidence-based methods for assessing individuals for or at work, their use within organizations is frequently politicized, and used to enhance the power and influence of specific individuals or groups. We believe that researchers and practitioners need to be better aware, and potentially accommodating, of multiple perspectives when identifying and defining outcome criteria like performance ratings. That said we recognize that this in itself is a political action likely to meet resistance, because it challenges an historic alignment with management, and also means critically appraising fundamental reductionist assumptions about the 'true' objective nature of job roles and performance.

Notes

- 1 See Blickle, Frieder, and Ferris, Chapter 11 in this *Handbook* for an extensive discussion of political skill.
- 2 The US is comparatively unusual in that the two main political parties do not control who can run for political office, leaving political candidates more independent of party discipline, policy, and finance (Stokes, 2005).
- 3 For an extensive review of this literature see Ferris and Treadway (2012).
- 4 For further discussion of problematization as theory building see Alvesson and Kärreman (2007).

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Cognitive Ability

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INTRODUCTION

In the broadest sense, cognitive ability is the capacity to process, understand, reason with, and remember information. Cognitive ability comprises a large variety of constructs that differ in terms of their specificity and the hierarchical level they occupy in the construct taxonomy, which is why scholars frequently use the term cognitive abilities in the plural form. In this chapter, *cognitive ability* refers to the entire construct domain, including the many lower-order, specific (but highly related) abilities. *General mental ability* (GMA) refers to what these abilities have in common – termed intelligence by many, and expressed in the statistical concept of the general factor (often termed *g*) extracted from a large variety of specific ability measures.

Individuals apply cognitive abilities to most everyday, academic, and occupational tasks. Even tasks that require little attention and are considered ‘programmed’, ‘automatic’, or ‘intuitive’ require the use of basic cognitive abilities to process information and apply decision heuristics (Hodgkinson, Sadler-Smith, Burke, Claxton, & Sparrow, 2009; Kruglanski & Gigerenzer, 2011; Pashler, Johnston, & Ruthruff, 2001). In fact, it is difficult to envision a single life activity that does not rely on a person’s cognitive ability. Even highly practiced tasks, which are more poorly predicted

by abilities (Ackerman, 1986), will require cognitive resources and abilities to be performed successfully in new contexts (as is the case when skills required in training are transferred to on-the-job performance). As a result, cognitive ability is among the most studied constructs in the behavioral sciences in general, and industrial, work, and organizational (IWO) psychology in particular. The last century of modern (peer-reviewed and published) research has established that cognitive ability is among the best – if not *the* best – individual differences-based predictor of individuals’ success in organizations. It relates to learning and success in educational settings, to training and job performance in occupational settings, and to attaining a host of positive (and, to some extent, also avoiding negative) career and life outcomes.

Grandiose claims of a construct’s importance invariably elicit rejection by some. This is especially true when the words ‘important’ or ‘best’ are erroneously interpreted to mean ‘sufficient’ or ‘only’. Disputes are exacerbated when the construct in question is an individual differences variable, and a high standing on the trait is perceived to be a judgment of an individual’s value to society. Deary (2012), in his even-handed review, discussed the wide

range of attitudes that intelligence research attracts from lay and professional outsiders. These

attitudes include interest (research reports on intelligence often attract much media interest), indifference (much of mainstream psychology and wider social science ignores individual differences in intelligence), and hostility (the emotional heat generated by some aspects of intelligence research is matched by few other topics in psychology). [...] Intelligence is rarely discussed for long before the word 'controversial' appears. (p. 454)

This, in part, has also been the fate of cognitive ability research in organizational settings.

The true value of a construct for improving the productivity and well-being of individuals, organizations, and societies, can only be demonstrated by empirical evidence of validity and utility for predicting outcomes and solving problems in organizational settings (as opposed to laboratory studies). This chapter reviews the most important evidence that speaks to these issues. Interested readers are also referred to the summary provided by Ree, Carretta, and Steindl (2001) in the previous edition of this *Handbook*, as well as Stanek and Ones' comprehensive treatment of the structure of cognitive abilities in Chapter 13 of this *Handbook*. Building on this work, this chapter summarizes important issues surrounding the use of cognitive ability tests in organizational settings, and highlights new developments that are becoming particularly pertinent given demographic changes in many societies and international economic trends (e.g., age differences, cross-cultural assessment, internet-based testing).

WHY DOES COGNITIVE ABILITY MATTER?

While even the most complex activities or jobs can be broken down into the tasks necessary to carry them out successfully, the value of cognitive ability comes into better focus once examined through a wider lens. For several decades now, IWO psychologists have known that cognitive ability predicts performance because it relates to knowledge acquisition (Hunter, 1986). Some have gone as far as defining general mental ability as the ability to learn (see Sternberg & Detterman, 1986). The central role of cognitive ability in learning processes underscores its importance for the prediction of performance in complex, real-world settings, such as education and on the job. Individuals who are able to process, understand, reason with, and remember information well are able to learn from academic and occupational

training and acquire the knowledge relevant to complete tasks successfully. In Campbell and colleagues' model of job performance (Campbell, Gasser, & Oswald, 1996; Campbell, McCloy, Oppler, & Sager, 1993), individual differences in performance are a function of both direct and indirect determinants. Direct determinants include *current* job knowledge and skill, as well as motivational factors that relate to the choice to expend effort (including its level and duration). Cognitive ability is an indirect determinant that produces individual differences in the direct determinant – job knowledge – through its role in learning processes. Just like other indirect determinants (e.g., training), its influence is mediated by the direct determinant, job knowledge. Several important investigations in IWO psychology have demonstrated this persuasively for a variety of jobs (Borman, White, Pulakos, & Oppler, 1991; Hunter, 1986; Schmidt & Hunter, 1992).

Cognitive ability is not only responsible for the level of current declarative and procedural knowledge, but will also facilitate *future* knowledge acquisition in changing settings or contexts as the nature of individuals' tasks change (e.g., promotion into a new role, performance in unfamiliar environments that can be poorly simulated in prior job training). This realization is particularly important with regard to the discussion of relative usefulness of general mental versus specific ability tests. Specific tasks will always be predicted by specific knowledge and specific skills. However, very few educational and vocational experiences are so static as to require the same or similar composition of tasks to be performed, and thus the same knowledge, skills, and specific abilities to perform them well over time. General mental ability plays a central role in determining performance, particularly complex and multidimensional job performance (see Campbell, 2012), because it allows individuals to continuously acquire new knowledge, integrate it into existing knowledge structures, and meet the challenges of nonroutine tasks successfully. William Stern aptly described this as 'adaptability to new problems and conditions of life' (Stern, 1911, p. 3). Sternberg's (1997) definition is similarly broad:

Intelligence comprises the mental abilities necessary for adaptation to, as well as shaping and selection of, any environmental context. [...] Intelligence is not just reactive to the environment but also active in forming it. It offers people an opportunity to respond flexibly to challenging situations. Because the landscape of an environmental context changes over time, adequate adaptation, shaping, and selection involve a process of lifelong

learning, one that starts in infancy and continues throughout the life span. (p. 1030)

The world of work is just one such environmental context. Individuals who are better able to adapt to and even actively shape it will be more successful.

PREVALENCE AND USE OF COGNITIVE ABILITY TESTS

In the context of IWO psychology, measures of cognitive ability see their most widespread use for making admissions decisions in higher education as well as employee selection decisions in personnel staffing. In both cases, cognitive ability can be assessed by a variety of means, or different assessment modalities. Among them, standardized psychometric tests are among the best known, yet not necessarily the most popular methods. Cognitive ability assessment using alternative methods is discussed later in this chapter. This section is concerned with prevalence of and reactions to cognitive ability tests, as they are one of the earliest and most prominent examples of standardized ability assessment.

Educational Settings

There exists a plethora of both international tests and homegrown measures (i.e., assessments developed by individual educational institutions, groups, or licensing bodies) too numerous to list or discuss. However, several standardized tests, mostly originating from the North American context, are well known, empirically supported, and often used globally, and thus worth mentioning here. These tests provide the advantage of standardization not only in terms of large and detailed norm groups, but also in terms of test scoring and administration procedures. For several decades now, the exemplary assessments in this category have been centrally developed and administered in a standardized fashion using regionally distributed testing centers. These days, many of them are delivered online and in an adaptive mode (see Weiss, 1983, 2011, as well as Wainer, Dorans, Eignor, Flaughner, Green, Mislevy, Steinberg, & Thissen, 2000, for a primer). These large-scale testing efforts, consistent in content domain coverage and administration, are particularly suitable for empirical investigations of their predictive value and meta-analytic synthesis of results, enabling us to draw firm conclusions regarding their relative effectiveness for predicting academic success.

The SAT (originally termed the *Scholastic Aptitude Test*, later the *Scholastic Assessment Test*), is one of the earliest standardized cognitive ability tests developed for large-scale assessment in educational settings. Its introduction in 1926 followed the earlier implementation of other large-scale, IWO psychologist-designed testing programs, such as *Army Alpha* and *Army Beta* during World War I (see Carson, 1993). In its early days, the SAT resembled other intelligence tests of its time – made up of several subtests, with both verbal and mathematical content, using traditional ability item types such as antonyms, analogies, and number series (Lawrence, Rigol, Van Essen, & Jackson, 2003). However, more crystallized abilities and knowledge were also tested. Content and format of the test have been revised throughout the last 90 years, and together with the ACT (originally the *American College Testing Assessment*, developed in the 1950s, and more closely oriented along school curriculums), it is now completed by the majority of college-bound young adults in the US, even though universities differ in terms of the emphasis placed on test scores when making admissions decisions (see below).

Other tests exist for the prediction of academic success in graduate studies, some general and some subject-specific. The *Graduate Record Examination* (GRE) is used in student admissions across a wide variety of disciplines. It comprises verbal and quantitative reasoning sections as well as an analytic writing section. As of 2017, it was used by more than 3,000 institutions in more than 160 countries (Educational Testing Service, 2017). The *Graduate Management Admission Test* (GMAT) serves a similar purpose, but was developed specifically as a predictor of success in graduate business education. Similar to the GRE, it includes verbal and quantitative reasoning content and an analytical writing assessment. As of 2017, it was used by more than 2,000 institutions in more than 100 countries (Graduate Management Admission Council, 2017). Other discipline-specific tests include the *Dental Admission Test* (DAT), *Law School Admission Test* (LSAT), *Medical College Admission Test* (MCAT), and the *Pharmacy College Admission Test* (PCAT); each measuring a combination of general problem solving, verbal-, quantitative-, logical-, and critical-reasoning skills, in addition to subject-specific knowledge. While these tests see use mostly in the US, Canada, and Australia, similar tests exist in other countries and world regions (e.g., the GAT general and subject tests in Pakistan, the Postgraduate Admission Test for admission to graduate schools in China, the TUS and DUS for medical/dental school admission in Turkey). Educational testing programs also exist

throughout countries of the European Union, however, large-scale, consistent efforts (i.e., government sponsored or independent tests accepted by the majority of institutions) are less prevalent. Reasons might be found in an even stronger reliance on high-school graduating exam scores (e.g., baccalaureate in France), greater availability of educational resources and ensuing reduced competition and screening of students (e.g., the case of many academic fields in German universities), as well as a higher level of skepticism regarding standardized testing, in part due to fears of socioeconomic discrimination, at least in some EU member countries (Schweizer, 2006).

Even in the US, where large-scale standardized testing has a long history in higher education admissions, trends indicate a reduced prevalence of cognitive ability test use. While the number of college-bound students taking the SAT has increased or held steady over the last decade (see data reported in College Board, 2007, 2009, 2012, 2014, 2016), the emphasis placed on test results by many universities has declined. There is now a growing number of ‘test-optional’ or ‘test-flexible’ institutions in the US (see the list maintained by the National Center for Fair and Open Testing, 2017), that make submission of SAT, ACT, or similar test scores optional for college applicants. While reasons for this trend are multifaceted, activist groups are emphasizing positive implications for student body diversity (Rooney, 1998), as dropping admission test requirements is postulated to increase minority group member admission rates. While it is true that there are significant group mean-score differences on educational admission and other types of cognitive ability tests (see below), this movement in itself is controversial as its effects on increasing student body diversity have been questioned (Belasco, Rosinger, & Hearn, 2015), and implementation of test-optional policies is fraught with difficulties for most large institutions (Zwick, 2007). Nonetheless, the emphasis that US institutions place on test scores in college admissions seems to be shrinking. Survey data from the National Association for College Admission Counseling (NACAC) shows that among its member institutions, the proportion of universities that place ‘considerable importance’ on SAT and ACT scores has consistently decreased over the last ten years, and that grades for college preparatory and other classes are considered more important on average (NACAC, 2005, 2008, 2015). Of course, the exact relative weight paid to each factor in making admission decisions cannot be gleaned from such surveys. While the criterion-related validity of cognitive ability tests for predicting student success is well established (see below), it

is encouraging that a large proportion of universities (78% of NACAC members) conduct their own validity studies, with more than half doing so annually and most independent of the tests’ publishers (NACAC, 2016).

Occupational Settings

The list of cognitive ability tests used in occupational settings is undoubtedly significantly longer than that of tests used for admission decisions in educational settings. Several hundreds of commercial measures exist in the US alone, and European test publishers offer a similar variety of professionally developed tests. Many of these tools are supported by extensive data and validity evidence (albeit not all of them; the Buros *Mental Measurements Yearbook* [buros.org/test-reviews-information] is a good resource for independent evaluation in this regard). In addition to commercially available tests, there are an abundance of measures developed by individual organizations, sometimes following the highest professional standards (including translation into several languages, detailed norms, and validity evidence, see Gibby, Ispas, McCloy, & Biga, 2009, for example), but also sometimes in the form of idiosyncratic collections of various test questions of unknown provenance and psychometric quality. In this way, cognitive ability assessment does not differ much from other assessment methods, such as assessment centers or employment interviews, which some organizations are trying to develop in-house. Compared to those methods, however, the landscape of standardized cognitive ability tests probably includes a higher proportion of measures that can be bought off the shelf and deployed across a variety of industries and occupations.

Thus, it is all the more surprising that actual cognitive ability test use still lags behind other assessment measures or predictor tools commonly used in selection and staffing. Ryan, McFarland, Baron, and Page’s (1999) survey of international selection practices, despite its age, is still the most cited source on the issue of organizational assessment practices in employee selection. The goal was not to establish precise prevalence of use for different tools (response options included frequency descriptions on a five-point scale), but to compare usage internationally/cross-culturally. Above-average use of cognitive ability tests was reported by organizations in the Netherlands, Belgium, Portugal, Spain, South Africa, New Zealand, and the United Kingdom, whereas respondents in Germany, Hong Kong, and Italy reported especially low levels. Among the 14 different selection/assessment

methods included in the survey, cognitive ability tests were among the three most frequently utilized methods in 15 of 18 countries. At the turn of the century, based on these selective survey results, it seems that in cases where assessments were used to aid in employee selection decisions, tests of cognitive ability were included with some frequency.

More recent, region-specific and sometimes more precise surveys of assessment method use exist. Data from the US indicate that about half of organizations use 'skills testing' of some sort (Piotrowski & Armstrong, 2006), yet do not indicate how prevalence differs for tests of general mental versus specific cognitive abilities. In the UK, 47% of organizations indicate use of the former (GMA) and 47% of the latter (Chartered Institute of Personnel and Development, 2009). While prior results from the same survey indicate that this is a slight increase, cognitive ability test use lags behind use of competency-based interviews, which are utilized by nearly 70% of employers in the UK (Chartered Institute of Personnel and Development, 2007, 2008). Data from New Zealand are consistent with this pattern; 47% of organizations indicate the use of cognitive ability tests for managerial positions, and 31% for nonmanagerial positions (Taylor, Keelty, & McDonnell, 2002) – which is a significant increase over similar results a decade earlier, but still represents a much lower frequency than that of employment interviews, which are used by nearly 100% of all responding organizations. Most non-Anglo countries show lower prevalence of cognitive ability test use. For example, in Germany standardized test use has been estimated to be about 10%, mostly for selection into low-complexity jobs or apprenticeship positions (Marcus, 2003; Schuler, Frier, & Kauffmann, 1993). It is likely that these numbers have increased in recent years, however. Recent data from German-speaking Switzerland show about 19% of organizations use ability tests, compared to nearly 100% that use interviews, reference checks (90%), or personality tests (32%) (König, Klehe, Berchtold, & Kleinmann, 2010). As Ones, Dilchert, Viswesvaran, and Salgado (2017) have pointed out, data from several world regions are sorely lacking (most notably Latin America, the Middle East, and Africa, but also Eastern Europe and southern Asia). The number of research studies on various issues surrounding cognitive ability test use (e.g., validity, group differences) emerging from these regions, however, seems to suggest that use of cognitive ability tests is increasing.

Given their rich history in IWO psychology (cognitive ability tests were among the earliest standardized assessment tools – developed well before assessment centers, personality tests, situational judgment tests [SJTs], or the idea of

structured or competency-based interviews), there has been much discussion of the potential reasons for their lagging adoption. While cognitive ability test use is certainly pervasive in Anglo countries and seems to be increasing elsewhere, relatively infrequent use when compared with other methods such as the employment interview – particularly in light of demonstrable criterion-related validity for job performance – is puzzling. Murphy, Cronin, and Tam's (2003) survey of members of the Society for Industrial and Organizational Psychology provided invaluable insight into the opinions of our profession: Although there was agreement that standardized tests can measure GMA reasonably well, generally predict job performance, and increase in importance with complexity of the job, there was significant disagreement regarding the status of GMA as the most important determinant of job and training performance, regarding a potentially resulting mandate to use cognitive ability tests in selection, and furthermore, regarding whether the choice of using such tests ultimately comes down to a question of values.

Such diversity of opinions among the scientifically informed community raises the question of organizational barriers to standardized cognitive ability test adoption, and whether similar opinions are held by practitioners. Terpstra and Rozell (1997) sampled 201 medium and large-size US organizations and reported that the two most highly ranked reasons for nonadoption were doubts regarding the tests' usefulness and concerns about potential legal liability. However, their methodology used a forced ranking of relative perceived importance of potential barriers. Rynes, Colbert, and Brown (2002) surveyed opinions of more than 900 members of the Society for Human Resource Management, and compared their answers to the empirically (meta-analytically) established knowledge base in IWO psychology. HR professionals' responses revealed that some of them overestimated the value of certain noncognitive characteristics in comparison to cognitive ability (e.g., for predicting leadership success). Perhaps most egregiously, more than 40% of HR professionals were of the erroneous opinion that high cognitive ability can be detrimental when it comes to job performance in low-skilled jobs. Finally, a very informative approach to investigating organizations' reasons for not using standardized tests was followed by Ryan et al. (2015), who surveyed nearly 1,200 high-level HR professionals across countries in all 10 GLOBE regions. Their study allowed for selection of multiple reasons that were barriers to test use – unfortunately, test use here referred to all types of standardized tests, including noncognitive ones. Nonetheless, results are informative; 60% of respondents indicated they preferred their own (presumably homegrown) methods of assessment, including interviews, resume, or CV

review. The next most frequent reason was expense (38%), followed by several internal, political, or administrative barriers (lack of buy-in, difficulties with implementation, lack of knowledge of suitable tests). The two most frequently mentioned reasons for standardized test adoption were validity (83%) and fairness (68%). These results were not cognitive ability test-specific but are nonetheless encouraging, as they pertain to the class of standardized tests used as employee selection tools as a whole. Studies and meta-analyses on applicant reactions corroborate these findings for cognitive ability tests: In occupational settings (i.e., excluding laboratory studies with student samples), they are among the assessment tools rated most favorably by job applicants (Anderson, Salgado, & Hülsheger, 2010). Anderson and colleagues concluded that although standardized tests are generally considered impersonal, the relative favorability of cognitive ability tests was due to perceptions of scientific validity, respect for test-taker privacy (e.g., compared to methods such as background checks or personality measurement), and perceived opportunity to perform.

Organizations and individuals seem to be gaining increasing awareness that tests ‘work’. The primary hurdle to increasing cognitive ability test adoption seems to be a persistent preference for less standardized selection methods, such as resume review and interviews, which are most likely perceived to be required to establish minimum qualifications (e.g., regarding candidate experience), more content valid (e.g., job-relevant interview questions), or more customized to organizational needs. While their relative efficiency compared to cognitive ability tests will be discussed later in this chapter, the overlap with standardized tests will be discussed next.

OTHER ASSESSMENT METHODS

Although many managers and human resources practitioners (and, to some extent, the above discussion) might distinguish between and compare cognitive ability tests and ‘interviews’, ‘assessment centers’, and the like, such comparisons have limited usefulness and are often erroneous. The problem is known as the ‘content–format confusion’ (Chan & Schmitt, 1997; Ryan & Greguras, 1998). Our science distinguishes between different constructs, such as cognitive ability and personality, as well as different methods to assess them, such as standardized tests or interviews. This distinction is particularly important for IWO psychology practitioners (see Arthur & Villado, 2008). The choice is not whether to assess cognitive ability in

educational or occupational settings – if learning or performance are desired outcomes, cognitive ability will matter. The question is *how* to assess it.

Standardized tests are certainly the most commonly used method for dedicated cognitive ability assessment. In addition, employment interviews, assessment centers, SJTs, and application blanks or biodata inventories are among the IWO psychology tools that can be used to assess cognitive abilities. There are clear-cut criteria that can be used to identify the most suitable method (i.e., reliability and validity of scores obtained). However, the choice can also be based on considerations relating to the assessee population (e.g., applicant reactions, degree of expected variability in ability), as well as organization-specific factors (e.g., cost of assessment process, other tools already in use, acceptability and buy-in) and larger context (e.g., legal and regulatory environment).

Interviews

Several meta-analyses have investigated the degree to which employment interviews capture variance in individuals’ cognitive ability. Early quantitative summaries estimated that interview evaluations overlap moderately strongly with scores on cognitive ability tests (mean observed correlation $[r] = .25$; mean corrected correlation $[\rho] = .40$). The relationship was stronger when interviews exhibited low ($\rho = .52$) rather than medium ($\rho = .40$) or high ($\rho = .35$) structure (Huffcutt, Roth, & McDaniel, 1996).¹ Given the unique role of the respective tools in employee selection processes – cognitive ability tests are most likely administered early and to a larger group of applicants, while interviews are likely administered later, to candidates who might have been prescreened – range restriction is likely to attenuate these relationships. Berry, Sackett, and Landers’ (2007) meta-analysis carefully disentangled the effects of both direct and indirect range restriction on the overlap observed between scores obtained using standardized tests and interviews. They report an overall, fully corrected correlation of $\rho = .27$, which increases from .22 for high-structured interviews to .48 for medium-structure interviews (only three studies with low-structure interviews were available where range restriction information was available). While this interview–cognitive ability test overlap is smaller than that reported previously, one should note that these values reflect all types of interviews, regardless of whether they were specifically designed to assess cognitive ability. Although Berry et al.’s moderator analysis showed that proportion of cognitive ability content (coded in terms of percent of

dimensions that were cognitive in nature) was not a strong moderator of the relationship, their coding tables also show that very few interviews are actually designed to explicitly assess cognitive ability or skills (across 33 studies where information was available, the proportion of cognitive dimensions ranged from 0 to 50, with an average of only 15% per interview). Roth and Huffcutt (2013) argue that these findings are likely due to the inclusion of interviews other than those conducted in employment settings – most notably for academic admissions. Their reanalysis of the Berry et al. dataset resulted in an estimated overlap more in line with previous findings ($p = .42$ for employment samples). In sum, there is a notable relationship between evaluations received in interviews and scores obtained on cognitive ability tests, particularly among job applicants in employment settings. Even interviews that are not specifically designed to measure cognitive ability capture ability differences among individuals to a notable degree. Interviews for which ability-related questions are specifically designed, or where interviewers are asked to rate candidates on ‘mental capacity’, ‘critical thinking’, or ‘problem solving’, can be expected to show stronger overlap. For the purpose of combining general employment interviews with cognitive ability tests, we should assume that the (observed) score overlap does not exceed the .30s range, and thus each method can be expected to provide incremental validity over the other. While scores from standardized cognitive ability tests will undoubtedly be more reliable than interview-based evaluations, organizations that are unable to implement such testing for whatever reasons would be well served to design an interview process that evaluates candidates in terms of cognitive ability or problem solving-related competencies. Given the near-ubiquitous use of interviews as a means of candidate assessment in personnel selection, as revealed by the various survey results reviewed above, this recommendation should be attributed high importance.

Assessment Centers

Assessment centers see much less frequent use for personnel selection purposes than interviews, and when they do, they are most often employed for selection into managerial jobs. However, their usefulness as potential measures of cognitive ability warrants discussion, because the construct versus method distinction has long been recognized in assessment center research and practice (cf. Sackett & Dreher, 1982; Woehr & Arthur,

2003). *Exercises* such as simulations, group discussions, or in-baskets (but also tests and interviews) can be used to measure a variety of knowledge, skills, abilities, and other characteristics, which are expressed in *dimension* scores. Arthur, Day, McNelly, and Edens (2003) analyzed a large number of assessment center dimensions and classified them into seven dimension categories. One of these higher-order dimensions is explicitly cognitive in nature and would be expected to capture most variance in cognitive ability – ‘Problem Solving’. Dimension labels used in individual assessment centers that contributed to this category include ‘analysis’, ‘cognitive analytical skills’, ‘fact finding’, ‘general mental ability’, and so forth. A second higher-level dimension category, ‘Organizing and Planning’ includes at least some cognitive content (‘organizing’, ‘planning and scheduling’, ‘strategic thinking’, in addition to many noncognitive characteristics).

Hermelin, Lievens, and Robertson (2007) pointed out that there seem to be two different lines of practice when it comes to assessment center score use. While dimension-based scores are often used when assessment centers are administered for development purposes (sometimes termed development centers), overall assessment center scores seem to be used frequently for the purpose of employee selection. In discussing the optimal way of assessing cognitive ability with assessment center scores, both approaches merit consideration. Collins and colleagues’ (Collins, Schmidt, Sanchez-Ku, Thomas, McDaniel, & Le, 2003) meta-analytic results show that overall assessment center ratings correlate more strongly with cognitive ability test scores than do general employment interviews (mean observed $r = .43$; $p = .67$; $N = 5,419$, $k = 34$). The underlying mechanisms driving this relationship are unclear, due to the nature of overall assessment center ratings in individual studies and how these are combined in meta-analytic summaries. For example, the relatively strong overlap might be due to the fact that assessee’s cognitive ability test scores are available to raters in many assessment centers (something that is known to significantly strengthen the overlap between test scores and interview evaluations; Berry et al., 2007; Roth & Huffcutt, 2013), or because when forming overall assessment center scores, many organizations and raters use holistic data combinations techniques (cf. Kuncel, Klieger, Connelly, & Ones, 2013), which might increase relationships observed with cognitive ability test scores. In a large-scale primary study, Dilchert and Ones (2009) demonstrated that when using dimension-based scores, assessment centers can measure cognitive ability to some degree. Among more than 4,800

managers, scores on the problem solving dimension (see Arthur et al., 2003) correlated $r = .32$ (observed) with scores on a cognitive ability test battery; none of the other dimension scores displayed notable relationships with ability. Meriac, Hoffman, and Woehr (2014) reported slightly lower overlap (corrected, meta-analytic $\rho = .29$), but also found similar relationships between other assessment center dimensions and cognitive ability. Interestingly, when candidates are evaluated on assessment exercise performance alone (e.g., how well they do in a group discussion, versus how they are rated on various behavioral dimensions), we can still observe relationships with cognitive ability test scores. Meta-analytic true-score correlation estimates range from .13 to .30, with observed score overlap from $r = .10$ to .25 (Hoffman, Kennedy, LoPilato, Monahan, & Lance, 2015); scores on in-basket exercises assess cognitive ability best.

In sum, cognitive ability, as measured by standardized psychometric tests, relates to how well individuals analyze data, reason with information, and solve problems, including business-related problems in simulations and assessment center exercises. Overall assessment center scores are a surprisingly good reflection of individuals' cognitive ability, but for several potential reasons which are hard to disentangle. Organizations that are interested in measuring cognitive ability using an assessment center are advised to focus on dimension-based problem solving scores.²

Situational judgment tests

Situational judgment tests 'are measurement methods that present [individuals] with job-related situations and possible responses to these situations' (Lievens, Peeters, & Schollaert, 2008, p. 427). Options differ in terms of 'correctness' or the degree to which a given response reflects an effective or ineffective solution to the situation at hand. While this assessment modality has a long history in IWO psychology, the method was popularized again in the 1990s (see work by Motowidlo, Dunnette, & Carter, 1990) and was also subject to some content-format confusion (see the work by Sternberg and colleagues, e.g., Sternberg & Hedlund, 2002; Wagner & Sternberg, 1985). Like interviews and assessment centers, SJTs are a *method* and can be designed to measure a variety of *constructs*, including cognitive ability. What distinguishes them from traditional standardized tests is that items (the scenario and response options presented) are more job-related in content, and that, depending on the assessment modality

(i.e., paper-and-pencil, video-based, adaptive or dynamic), the stimulus material can exhibit significantly higher fidelity in simulating real-world problems and tasks. At the same time, in contrast to typical interviews and assessment centers, they are still 'test-like', meaning they can be administered with comparatively low administrative load, scored automatically (based on pre-determined scoring keys), and even deployed remotely or online.³ In this way, they provide the opportunity to capitalize on many positive measurement attributes of standardized tests, such as consistency in scoring and higher reliability.

Situational judgment tests were developed as contextualized measurement methods and first gained popularity among practitioners for assessing interpersonally oriented (i.e., noncognitive) skills (Lievens et al., 2008). Nonetheless, scores from SJTs correlate with cognitive ability, and these tests can be purposefully designed to increase cognitive ability variance if so desired. Organizations that aim to assess cognitive ability using SJTs should first ensure that the constructs or dimensions being measured are cognitive in nature and that item content reflects the relevant abilities (similar to decisions made in assessment center design). Christian, Edwards, and Bradley (2010) conducted a meta-analysis of SJT validity by construct domain assessed. They could locate only a few tests that were specifically designed to measure knowledge or skills and none that were developed to specifically measure cognitive ability.⁴

Beyond content, another key factor in assessing cognitive ability using SJTs are the instructions provided to assesseees. Knowledge instructions (e.g., 'rate the best/worst option', 'what should you do?') result in moderate overlap ($r = .32$) between SJT and cognitive ability test scores, whereas SJTs with behavioral tendency instructions (e.g., 'what would you do') carry less cognitive ability variance ($r = .17$) (McDaniel, Hartman, Whetzel, & Grubb, 2007). There are other design choices that are known to increase the overlap with scores on traditional standardized tests. For example, SJTs with written instructions show a higher correlation with cognitive ability test scores compared with those where instructions are presented in audio form (as is the case in video- or multimedia formats). This is likely due to the higher reading component (Lievens et al., 2008). However, maximizing the cognitive ability load in this way might be a double-edged sword; reading proficiency is a specific, less direct measure of GMA, and research has shown that when content is held constant, the higher-fidelity version of the same SJT exceeds the written one in terms of criterion-related validity (Lievens & Sackett, 2006).

Standardized tests versus alternative methods

Having reviewed the most common alternatives to traditional standardized tests, we can attempt to answer the question of the best method for assessing cognitive ability in organizations. Of course, the answer depends in large parts on the assessment context and goals. Organizations that are not yet assessing cognitive ability in any form might be advised to incorporate cognitive question content into their (structured) employment interviews. Survey data of assessment method use show much variability across countries – the only consistent finding is that nearly all organizations administer interviews. Those that do not already evaluate cognitive characteristics as part of this process are foregoing criterion-related validity of their assessment processes. Much IWO psychology research has explored behavioral and situational interview question types to measure a variety of noncognitive constructs, but unfortunately our field still has little to offer for nonknowledge-based ability assessment. In recent years, several companies have experimented with the ‘Microsoft interview’ – a technique consisting of various puzzles, Fermi (estimation) problems, and brain teasers (Mulrairie, 2010; Poundstone, 2003). Some who have tried it (most notably Google) abandoned such questions due to a lack of validity and have refocused on standardized cognitive ability tests paired with interviews assessing noncognitive characteristics (Bock, 2015). The only advisable approach based on evidence available at this time might be the inclusion of knowledge-based (crystallized) ability and job knowledge questions. Unfortunately, the latter will come at the cost of generalizable prediction (e.g., future performance in different roles). And even if such questions were included, interviews represent other drawbacks when it comes to assessment in general – most notably in terms of the number of questions that can be administered in a given timeframe, lack of standardization in response format and evaluation, and typical number of interviewers/raters used, all of which have a negative impact on reliability of scores and thus limit their ability to predict important outcomes (Campion, Palmer, & Campion, 1997).

Assessment center scores are also based on evaluations or ratings, and as such suffer from some of the same drawbacks that limit their usefulness as dedicated measures of cognitive ability. In addition, many organizations already include standardized assessments to supplement the assessment center experience. Thus, the major recommendation with regard to cognitive ability measurement in this context is to ensure that information from cognitive dimension ratings and other information is combined statistically/algorithmically (based on

unit- or validity-weights, see Kuncel et al., 2013), to ensure that cognitive variance is not drowned out by holistic decision making. In addition, designing significantly reduced, mini assessment centers or individual simulations might be another fruitful approach for cognitive ability measurement.

Among the alternative assessment methods discussed above, the one that holds most promise for future development is situational judgment testing, which still seems to hold much untapped potential for the measurement of cognitive abilities. Many existing tests are simply contextualized skill or job knowledge measures. In this way, they are useful and offer several advantages over traditional cognitive ability tests (e.g., face validity, higher fidelity), but are far from innovative. Scenario-based item types that assess more basic (specific and general) cognitive abilities can be developed by incorporating contextualized tasks such as data processing or information analysis, or by increasing the memory load of SJT items and scenarios (especially multimedia ones). The trend of gamification has also reached IWO psychology (see Chamorro-Premuzic, Winsborough, Sherman, & Hogan, 2016; DuVernet & Popp, 2014; Landers & Callan, 2011, for example). Researchers and practitioners interested in cognitive ability measurement should explore construct-based SJT development in this regard as well. It might lead to a (second) renaissance for this assessment method in our field.

Ultimately, the popularity of traditional, standardized cognitive ability tests is not due to a lack of alternative methods, but rather their excellent assessment and measurement properties (ease of administration, scoring, and high reliability). In light of this and commonly encountered arguments against test adoption, the question of cost and utility merits a brief discussion. Utility is a function of many organization- and context-specific factors (including the number of applicants, selectivity of the organization, criterion-related validity of the assessment, and variability of job performance; Schmidt & Hunter, 1998). Assessment costs typically play a negligible role in utility estimation, but are nonetheless a frequently encountered barrier to test adoption. Thus, a comparison of the methods presented here is informative. A conservative estimate of interview costs would only consider wages (and fringe benefits) for the interviewer(s) time as the organization’s direct cost of the interview. Hiring interviews for entry-level jobs might be conducted by a human resources specialist. Median wage for the latter is \$28 per hour in the US (Bureau of Labor Statistics: Occupational Employment Statistics, 2015), plus 32% for fringe benefits (Bureau of Labor Statistics, 2017), bringing the cost of a one-hour, entry-level employment interview to \$37. Costs are significantly higher

when interviews are conducted by mid-level managers (e.g., \$75 for a bank branch manager), executives (\$111), or in countries where wages and fringe benefits are higher. These estimates do not include the additional costs of developing or purchasing an interview solution, scoring and processing evaluations, and so forth. Costs for assessment centers are multitudes higher, as they typically involve several raters engaged over the period of several hours or days in addition to development or license fees.

In comparison, cognitive ability tests are significantly more cost- and time-effective. To provide a general estimate, this author searched the assessment catalogue of the world's leading talent measurement and assessment provider. This yielded data for 81 unique standardized cognitive ability tests offered for use in personnel selection by 15 different US and international test publishers (51 specific ability tests, 30 GMA tests). For tests of specific cognitive ability, the median test price was \$15 (for purchasing individual tests; median price can be as low as \$9 when purchasing multiple assessments). GMA tests were slightly more expensive, but still comparatively cost-effective at \$32 per assessment (\$23 with volume discount). Not only are cognitive ability tests cheaper than other assessment methods, they are also significantly more efficient: The median estimated assessment time across the different tests is 10 minutes for specific ability measures and 50 minutes for GMA tests.

CRITERION-RELATED VALIDITY: SECOND-ORDER META-ANALYTIC SUMMARY

Standardized tests of cognitive ability predict learning success, job performance, and a variety of important life outcomes (Gottfredson, 1997b; Kuncel, Ones, & Sackett, 2010; Wai, Lubinski, & Benbow, 2005). The positive associations between cognitive ability and academic and work performance are among the most researched relationships in psychology. Thousands of primary studies have been conducted that document the validity of cognitive ability tests for various criteria in these settings. Dozens of meta-analyses have analyzed and summarized this evidence for different types of cognitive abilities (specific versus general), settings (military versus civilian), countries and cultures (US, Europe, Asia), jobs (low to high complexity), and groups of individuals (men and women, majority and minority group members). Meta-analytic results have been tabulated in great detail, and interested readers should consult the following sources: Ones, Viswesvaran, and Dilchert (2005b; particularly for validity in

educational settings and validities by group), Ones, Viswesvaran, and Dilchert (2005a; particularly for validity for training success and job performance by occupation and industry), Ones, Dilchert, and Viswesvaran (2012; particularly for joint and incremental validity with other measures), and Ones et al. (2017; particularly with regard to international settings). This section will provide a high-level summary of these results with an emphasis on drawing generalizable conclusions and identifying predictor–criterion relationships and settings that will benefit from further research or more detailed investigations. For this purpose, the author conducted a series of second-order meta-analyses.

Scientific research relies on primary studies and replication. However, conclusions drawn from a single primary study have limited generalizability, as results are based on specific samples and influenced by statistical artifacts. Psychometric meta-analysis can correct for the biasing influence of sampling error, measurement error, and other artifacts (see Schmidt & Hunter, 2014, chapter 2) and provide better estimates of mean operational validities or construct-level relationships. However, meta-analyses themselves are also based on a finite number of studies and can be subject to second-order sampling error. Second-order meta-analysis not only provides estimates of grand mean effect sizes across first-order meta-analyses, but also provides a way of estimating the proportion of variance across meta-analytic estimates that can be attributed to second-order sampling error (Schmidt & Oh, 2013).

To this end, the author of this chapter located independent meta-analyses of cognitive ability test validity in different settings. The more than 50 first-order meta-analytic sources tabulated by Ones and colleagues (see above) were supplemented with previously unavailable, re-analyzed, or recently published multi-sample data, and subjected to second-order meta-analysis. Only nonoverlapping sources contributed to these analyses. Independence of primary studies contributing to first-order meta-analyses summarized in a second-order meta-analysis is important not only to estimate the weighted grand mean effect size accurately, but moreover to model the between-meta-analysis variance of operational validities or true-score correlations. Variance in such estimates indicates the influence of second-order sampling error and the need for additional primary studies and more comprehensive meta-analyses to draw generalizable conclusions about a given relationship.

To ensure independence, sample characteristics and ability measures contributing to primary studies were examined for each first-order meta-analysis. For example, if a source summarized correlations between the SAT and grades in the

years 1979 to 1980 (Boldt, 1986) and another source included college freshmen cohorts from the years 1995 to 1997 (Sackett, Kuncel, Arneson, Cooper, & Waters, 2009), they could be combined into the same second-order meta-analysis. Similarly, if another meta-analysis reported relationships for a different test which was classified into the same construct (e.g., Westrick, Le, Robbins, Radunzel, & Schmidt, 2015, for the ACT), independence was assumed because few (if any) primary studies would include both measures for the same individuals. Other decision criteria used to establish independence included country (e.g., meta-analyses of US versus German versus Spanish criterion-related validity studies should not show primary-study overlap), industry and occupation (e.g., computer programmers would not be included in an analysis of firefighter performance), and job complexity. First-order meta-analyses that report on overlapping studies (e.g., Salgado, Anderson, Moscoso, Bertua, & de Fruyt, 2003a; Salgado, Anderson, Moscoso, Bertua, de Fruyt, & Rolland, 2003b) were coded if they provided unique information (e.g., validity by job complexity versus validity by test type); however, these sources were never analyzed for the same predictor–criterion-setting combination. Finally, some first-order meta-analyses were partial updates of previous ones; for example Hülshager, Maier, and Stumpp (2007) included German samples analyzed by Salgado & Anderson (2003) and Funke, Krauss, Schuler, & Stapf (1987). In turn, Kramer (2009) summarized many sources analyzed by Hülshager and colleagues. For each predictor–criterion relationship or setting, the most appropriate and comprehensive first-order meta-analytic source was included.

Finally, only first-order meta-analyses that reported consistently comparable effect size estimates were combined; sources had to report weighted mean observed r , SD_r , and operational validity (p , *not* corrected for attenuation due to measurement error in the predictor). Where this information was not available, the author re-analyzed primary study data if effect sizes and artifact distributions were reported in the source. The second-order meta-analytic techniques reported in Schmidt and Oh (2013) were used to conduct analyses of the final dataset. Results are reported in Tables 9.1 to 9.3, and discussed in the next section.

Education and Learning

General mental ability is a valid predictor of learning in educational settings. Across settings (results combined for college, graduate, business, and

professional schools), total scores on tests such as the SAT, ACT, GRE, MAT, GMAT, LSAT, PCAT, and MCAT predict grade point average (GPA) about equally well in the first year ($p = .47$) and subsequent years ($p = .51$). As can be seen in Table 9.1, the numbers of independent studies and meta-analyses that have been conducted in this domain are impressive. Most test–criterion relationships have been examined in several hundreds of studies and several meta-analyses (8 completely independent meta-analytic sources were identified for GMA tests and first-year GPA alone). For some relationships, the total, nonoverlapping sample size across studies is larger than 2 million.

Specific ability test scores (quantitative and verbal ability⁵) also predict grades well, albeit with slightly lower operational validity than tests of GMA ($p = .38$ and $.34$ for first-year GPA, and $.32$ and $.26$ for cumulative GPA in later years, respectively). Some of the difference in operational validity observed between general mental ability and specific ability tests might be due to differences in test reliability. For tests such as the GRE or SAT, GMA is indexed by total score composites across verbal and quantitative sections, and thus by a more reliable score. However, given the high reliability of the individual sections, the reliability difference is small and does not fully account for the difference in observed validity. Moreover, the GMA analysis also includes shorter tests that are not made up of subtests which would separately contribute to the specific ability analyses (e.g., Miller Analogies Test, MAT).

When contrasting directly comparable results (e.g., GPA only in graduate and professional school), a pattern of slightly reduced validities emerges for grades after the freshman year. This is true for tests of GMA (.50 versus .41), quantitative ability (.38 versus .32), and verbal ability (.34 versus .26), as would be expected based on previous work examining grade intercorrelations and test-validities over time (Humphreys, 1960; Humphreys & Taber, 1973). Despite these temporal decrements in validity, cognitive ability tests are good predictors of success in educational settings. This is especially true because in addition to the grade criteria reported here, admissions tests also predict a host of other success criteria such as research productivity, degree attainment, and creativity, among others (see Kuncel, Hezlett, & Ones, 2001, 2004).

Training Success

Occupations differ in terms of their cognitive demands and in terms of how frequently these demands change over time. Some jobs require

Table 9.1 Operational validity of cognitive ability tests in educational settings

<i>Criterion, setting, predictor</i>	N_{total}	k_{total}	k_{meta}	$\frac{E}{\bar{p}}$	$E\left(S_{\bar{p}}^2\right)$	$S_{\bar{p}}^2$	$\hat{\sigma}_{\bar{p}}^2$	var.acc.
<i>1st year grade point average (GPA)</i>								
Undergraduate, graduate, and professional school								
General mental ability tests	780,428	654	8	.47	.0002	.0019	.0017	9%
Quantitative ability tests	2,767,775	1,577	4	.38	.0001	.0000	.0000	100%
Verbal ability tests	2,769,827	1,597	5	.34	.0001	.0002	.0001	65%
Undergraduate								
General mental ability test batteries	652,238	239	3	.45	.0001	.0010	.0009	10%
Graduate and professional school								
General mental ability tests	128,190	415	5	.50	.0003	.0019	.0016	15%
Quantitative ability tests	96,042	1,563	3	.38	.0001	.0000	.0000	100%
Verbal ability tests	98,094	1,583	4	.34	.0001	.0001	.0000	90%
<i>GPA in later years</i>								
Undergraduate, graduate, and professional school								
General mental ability tests	191,391	243	6	.51	.0002	.0083	.0081	3%
Verbal ability tests	20,991	139	4	.26	.0003	.0027	.0024	11%
Undergraduate								
General mental ability tests	170,071	141	3	.53	.0001	.0075	.0073	2%
Graduate and professional school								
General mental ability tests	21,320	102	3	.41	.0007	.0010	.0004	65%
Quantitative ability tests	21,166	136	3	.32	.0005	.0001	.0000	100%
Verbal ability tests	20,991	139	4	.26	.0003	.0027	.0024	11%

Note: First-order meta-analytic effect size estimates that contribute to a given predictor–criterion analysis are completely independent; only meta-analyses that summarized primary studies from nonoverlapping time ranges (e.g., SAT from 1979–1980 and SAT from 1995–1997) or primary studies of different tests administered in different settings (GMAT in business school versus MCAT in medical school admissions) were included.

N_{total} = total sample size across first-order meta-analyses; k_{total} = number of independent effect size estimates across first-order meta-analyses; k_{meta} = number of first-order meta-analytic sources. Second-order meta-analytic results computed using formulas presented in Schmidt and Oh (2013); notation follows their example. $\frac{E}{\bar{p}}$ = Second-order, grand mean operational validity estimate (corrected for attenuation due to range restriction and measurement error in the criterion, where possible; not corrected for measurement error in the predictor measures); $E\left(S_{\bar{p}}^2\right)$ = expected (average) second-order sampling error

variance; $S_{\bar{p}}^2$ = observed variance across first-order mean operational validity estimates; $\hat{\sigma}_{\bar{p}}^2$ = estimated true variance across first-order mean operational validity estimates after expected second-order sampling error variance is subtracted out from the observed variance; *var.acc.* = proportion of observed variance across first-order mean operational validity estimates that is due to second-order sampling error variance.

Table adapted from: Dilchert (under review). Data sources: Boldt (1986); Donnon, Paolucci, and Violato (2007; meta-analytic source did not report standard deviations of observed and corrected correlations – primary studies were re-analyzed by this author, correcting for range restriction using u-values extrapolated from observed and corrected correlations reported in the source); Higdem, Kostal, Kuncel, Sackett, Shen, Beatty, and Kiger (2016, unreported information obtained from the authors); Kuncel, Credé, and Thomas (2007); Kuncel, Credé, Thomas, Klieger, Seiler, and Woo (2005); Kuncel, Hezlett, and Ones (2001, 2004); Linn and Hastings (1984); Postlethwaite (2011); Sackett, Kuncel, Arneson, Cooper, and Waters (2009; primary source reporting effect sizes for 41 independent samples that were meta-analyzed by this author; correction for range restriction used a criterion artifact distribution obtained from the 41 primary samples reported in this source); Shaw, Kobrin, Patterson, and Mattern (2012; meta-analytic source did not report standard deviation of observed and corrected correlations – data were re-analyzed by this author using mean effect sizes within each major, correcting for range restriction using an artifact distribution obtained from the 41 samples reported in Sackett et al., 2009); Westrick, Le, Robbins, Radunzel, and Schmidt (2015).

only initial training, while others require frequent updating of relevant knowledge and skills to maintain satisfactory performance. But even for the least complex of occupations, the ability to successfully complete job-relevant training and to acquire job knowledge and skills is important.

Table 9.2 presents second-order meta-analytic results for cognitive ability and training success. As in Table 9.1, operational validity estimates are presented that estimate the usefulness of these tests in organizational settings. First-order meta-analyses summarized for these relationships were fully independent, mostly ranging from 2–7 sources per relationship – but sometimes as many as 14 first-order meta-analyses.

These meta-meta-level results show that GMA predicts training success extremely well. The second-order operational validity estimate for scores on GMA test batteries is $\bar{\rho} = .63$ in heterogeneous or cross-occupation samples ($k_{\text{total}} = 616$). This effect is slightly stronger in military (.64) compared with civilian samples (.59), possibly because the former frequently use more reliable measures of training success (e.g., written tests). As first demonstrated by Hunter (1983) for a large number of jobs across the US economy, the validity for cognitive ability tests is generally higher with increasing cognitive demands of the job (for GMA, is in the .60s for medium- and high-complexity occupations, and .46 for low-complexity occupations; results in civilian-only occupations are even more drastic).

The operational validities of specific quantitative and verbal ability tests approach that of GMA tests, at least when predicting training success (.63 and .57, respectively). Again, results are a bit lower in the civilian-occupation-only analyses (.49, respectively). Quantitative and verbal ability, and to a lesser degree perceptual speed and spatial/mechanical ability tests, can be used to predict learning in occupational settings. Unfortunately, reporting of second-order meta-analytic results is constrained by the way in which first-order studies have grouped specific ability measures in the past. While several researchers had developed early test categorization schemes (see Pearlman, Schmidt, & Hunter, 1980; Schmidt, Hunter, & Pearlman, 1981, for example) and improved them over time, many quantitative reviews still group tests by content or item types rather than underlying abilities. In this regard, scholars should make use of more detailed and current classification schemes, such as the one offered by Stanek and Ones (Chapter 13, this *Handbook*), to enable more fine-grained meta-analytic investigations in the future. Such analyses might be especially informative with regard to specific ability–training success relationships.

Job Performance

Individual job performance might be the most important criterion in IWO psychology (Viswesvaran & Ones, 2005). When it comes to employee selection, the majority of assessment and staffing systems are designed to optimize broad criteria of employee job performance. Cognitive ability tests are an essential building block of such systems due to their nearly unmatched criterion-related validity.

Table 9.3 presents second-order meta-analytic results for tests of general mental and specific abilities for different job performance criteria and settings. Across occupations and criterion measures, GMA tests predict performance with a grand mean operational validity of .53. Validity estimates for military and civilian settings differ slightly (.54 versus .48).

It has long been established that cognitive ability gains in importance as job complexity increases (e.g., see Hülshager et al., 2007; Hunter, 1983; Salgado et al., 2003b). Unfortunately, these first-order meta-analytic findings are hard to cleanly document in a second-order summary. This is due to the fact that many early meta-analyses reported mean effect sizes (r and ρ) but often did not report variance of effects across studies, which are required for a proper second-order summary. Those meta-analyses that contributed to the present set of analyses for high job complexity levels represent only part of the literature, and might have undercorrected range restriction effects for these occupational samples. As a result, the operational validity estimates for high-complexity jobs presented here might be conservative estimates.

A few additional trends can be observed in these data. First, meta-analyses that included only rating criteria reported a slightly higher operational validity for GMA tests than those included in analyses for all broad performance criteria. Second, when contrasting results for rating and proficiency criteria, an interesting pattern emerges for specific abilities. Quantitative ability tests predict job proficiency criteria with much better efficiency than rating criteria (.50 for proficiency versus .39 for ratings). The opposite is the case for tests of verbal ability (.51 for ratings and .39 for proficiency) measures of job performance. These values should be considered strong indicators of criterion-related validity for these specific abilities; however, tests of GMA still exceed these values in nearly all settings.

Individual job performance is one of the most important variables of IWO psychology. As Campbell and Wiernik acutely observed, ‘without individual performance there is no team performance, no unit performance, no organizational

Table 9.2 Operational validity of cognitive ability tests for predicting training success

<i>Predictor and setting</i>	N_{total}	k_{total}	k_{meta}	$\frac{\sum k_i}{k_{\text{meta}}}$	$E\left(S_{e_{p_i}}^2\right)$	$S_{\bar{p}}^2$	$\hat{\sigma}_{\bar{p}}^2$	var.acc.
<i>General mental ability tests</i>								
Across all occupations ^{††}	197,115	616	14	.63	.0008	.0126	.0118	6%
High-complexity occupations [†]	5,343	28	3	.62	.0044	.0682	.0638	6%
Medium-complexity occupations [†]	12,972	91	4	.65	.0012	.0184	.0172	7%
Low-complexity occupations [†]	9,662	66	2	.46	.0012	.0061	.0048	20%
Military occupations [†]	94,161	146	3	.64	.0005	.0174	.0169	3%
Civilian occupations [†]	27,838	161	7	.59	.0013	.0252	.0238	5%
High-complexity occupations	4,254	22	2	.82	.0048	.0072	.0024	67%
Medium-complexity occupations	7,462	56	3	.72	.0012	.0075	.0063	16%
Low-complexity occupations	4,731	21	1	.36				
<i>Specific ability tests</i>								
Across all occupations								
Quantitative ability tests ^{††}	92,070	303	8	.63	.0008	.0266	.0258	3%
Verbal ability tests ^{††}	89,650	315	8	.57	.0009	.0191	.0182	5%
Perceptual speed and ability tests ^{††}	44,973	189	7	.34	.0022	.0110	.0088	20%
Spatial and mechanical ability tests ^{††}	85,707	293	8	.46	.0010	.0108	.0098	9%
Memory tests ^{††}	27,488	116	4	.39	.0011	.0129	.0117	9%
Civilian occupations [†]								
Quantitative ability tests [†]	12,066	67	2	.49	.0019	.0014	.0000	100%
Verbal ability tests [†]	15,066	84	2	.49	.0015	.0065	.0049	24%
Spatial and mechanical ability tests [†]	18,125	102	3	.45	.0012	.0030	.0018	39%
Memory tests [†]	4,124	21	2	.37	.0038	.0009	.0000	100%
Medium-complexity occupations [†]								
Quantitative ability tests [†]	9,318	68	5	.35	.0028	.0121	.0093	23%
Verbal ability tests [†]	12,908	85	5	.39	.0026	.0203	.0177	13%
Spatial and mechanical ability tests [†]	9,464	74	6	.39	.0024	.0149	.0125	16%
Memory tests [†]	6,838	57	5	.27	.0036	.0057	.0020	64%

Note: First-order meta-analytic effect size estimates that contribute to a given predictor–criterion analysis are completely independent; only meta-analyses that summarized primary studies from nonoverlapping time ranges (e.g., military samples before 1947 versus 1952 to 1982), primary studies conducted in different countries (e.g., US versus UK and Spain), or samples from different occupations (e.g., computer programmers versus firefighters versus sales jobs) were included.

See note accompanying Table 9.1 for full notation and more detailed information. [†] = Includes sources that mixed military and civilian samples. ^{††} = Across complexity levels; a separate military occupations analysis cannot be presented because specific ability tests have only been meta-analyzed in mixed samples.

Table adapted from: Dilchert (under review). Data sources: Barrett, Polomsky, and McDaniel (1999); Bertua, Anderson, and Salgado (2005); Foley (1986); Goertz, Hülshager, and Maier (2014); Helm, Gibson, and Brogden (1957); Hirsh, Northrop, and Schmidt (1986); Hülshager, Maier, and Stumpp (2007); Kramer (2009); McLaughlin, Rossmeissl, Wise, Brandt, and Wang (1984); Pearlman, Schmidt, and Hunter (1980); Salgado and Anderson (2002, 2003); Salgado, Anderson, Moscoso, Bertua, and de Fruyt (2003a); Salgado, Anderson, Moscoso, Bertua, de Fruyt, and Rolland (2003b); Schmidt, Gast-Rosenberg, and Hunter (1980); Zeidner (1987).

performance, no economic sector performance, no GDP' (2015, p. 48). The cumulative findings reviewed here show that cognitive ability is inextricably linked to group, organizational, and economic success through its strong link with job performance.

CONTEXT FOR AND CONSEQUENCES OF COGNITIVE ABILITY ASSESSMENT USE

When scores obtained from an assessment are used to distribute opportunities (e.g., choices about admissions, training, hiring), group mean-score differences

Table 9.3 Operational validity of cognitive ability tests for predicting job performance

Predictor and setting	M_{total}	k_{total}	k_{meta}	$\frac{M}{k}$	$E(S_{\epsilon_i}^2)$	$S_{\bar{p}}^2$	$\hat{\sigma}_{\bar{p}}^2$	var.acc.
<i>Broad job performance criteria (ratings, proficiency, quality, and quantity)</i>								
<i>General mental ability tests</i>								
Across all occupations ^{††}	453,796	1,527	22	.53	.0006	.0172	.0166	4%
High complexity occupations [†]	177,222	271	8	.52	.0005	.0272	.0266	2%
Medium complexity occupations [†]	61,420	220	7	.55	.0008	.0063	.0054	13%
Low complexity occupations [†]	19,323	73	3	.58	.0009	.0002	.0000	100%
Military occupations [†]	383,244	637	7	.54	.0003	.0212	.0210	1%
High complexity occupations	174,319	215	6	.52	.0004	.0270	.0266	1%
Medium complexity occupations	50,750	117	2	.58	.0003	.0006	.0003	47%
Low complexity occupations	18,459	61	2	.58	.0006	.0000	.0000	100%
Civilian occupations [†]	52,608	686	6	.48	.0008	.0063	.0055	12%
High complexity occupations	2,903	56	2	.71	.0065	.0015	.0000	100%
Medium complexity occupations	12,017	113	7	.26	.0018	.0109	.0091	17%
Low complexity occupations				*				
<i>Specific ability tests</i>								
Quantitative ability tests ^{††}	33,936	438	9	.48	.0017	.0088	.0071	19%
High complexity occupations [†]	1,070	66	2	.51	.0111	.0049	.0000	100%
Medium complexity occupations [§]	2,883	31	3	.22	.0057	.0034	.0000	100%
Verbal ability tests ^{††}	33,531	406	6	.44	.0012	.0107	.0095	11%
Civilian occupations [†]	7,261	66	3	.51	.0014	.0179	.0164	8%
Medium complexity occupations	2,480	22	2	.55	.0012	.0150	.0139	8%
Perceptual speed and ability tests ^{††}	93,779	1,255	7	.42	.0004	.0023	.0019	18%
Civilian occupations [†]	42,418	553	2	.38	.0002	.0005	.0003	36%
Spatial and mechanical ability tests ^{††}	21,445	222	8	.31	.0026	.0156	.0130	16%
Civilian occupations, med. complexity	9,129	85	4	.28	.0023	.0132	.0108	18%
Memory tests ^{††}	26,788	230	5	.36	.0017	.0115	.0098	15%
Civilian occupations [†]	3,974	39	2	.24	.0032	.0414	.0382	8%
High complexity occupations [†]	983	20	1	.29				
Medium complexity occupations [†]	9,813	56	2	.28	.0026	.0391	.0366	7%
Low complexity occupations [†]	10,000	55	1	.34				
Rating criteria of job performance								
<i>General mental ability tests</i>								
Across all occupations ^{††}	325,965	673	9	.59	.0004	.0057	.0052	8%
Military occupations [†]	307,746	502	3	.60	.0002	.0031	.0029	5%
Civilian occupations, medium complexity	5,926	60	4	.31	.0059	.0038	.0000	100%
<i>Specific ability tests</i>								
Across all occupations								
Quantitative ability tests ^{§†}	8,124	79	4	.39	.0032	.0235	.0203	13%
Verbal ability tests ^{§†}	7,261	66	3	.51	.0014	.0179	.0164	8%
Spatial and mechanical ability tests ^{§†}	12,879	125	5	.31	.0026	.0167	.0141	15%
Memory tests ^{§†}	3,974	39	2	.24	.0032	.0414	.0382	8%
Proficiency criteria of job performance (mostly tests)								
<i>General mental ability tests</i>								
Across all occupations ^{††}	71,879	287	5	.54	.0014	.0036	.0022	40%
Military occupations [†]	60,583	112	9	.61	.0000	.0003	.0003	8%

Table 9.3 Operational validity of cognitive ability tests for predicting job performance (continued)*Specific ability tests*

Across all occupations

Quantitative ability tests ^{†*}	25,812	359	5	.50	.0012	.0013	.0001	94%
Verbal ability tests ^{†*}	26,270	340	3	.39	.0010	.0001	.0000	100%
Perceptual speed and ability tests ^{†*}	51,361	702	5	.47	.0007	.0009	.0001	85%
Spatial and mechanical ability tests ^{†*}	8,566	97	3	.31	.0025	.0137	.0112	19%
Memory tests ^{†*}	6,019	99	3	.41	.0025	.0005	.0000	100%

Note: First-order meta-analytic effect size estimates that contribute to a given predictor–criterion analysis are completely independent; only meta-analyses that summarized primary studies from nonoverlapping time ranges (e.g., military samples before 1947 versus 1952 to 1982), primary studies conducted in different countries (e.g., US versus UK and Spain), or samples from different occupations (e.g., computer programmers versus firefighters versus sales jobs) were included.

See note accompanying Table 9.1 for full notation and more detailed information. * = Clean, within-test-type analyses cannot be presented for low-complexity occupations in civilian settings. The majority of first-order meta-analytic sources that report results by job complexity either do not report the required *SD*, applied inappropriate corrections which could not be reversed, or included mixed military and civilian samples. † = Mixed military and civilian samples. ‡ = Across complexity levels. § = Civilian occupations only.

Table adapted from: Dilchert (under review). Data sources: Barrett, Polonsky, and McDaniel (1999); Distefano and Paulk (1990); Foley (1986); Hirsh, Northrop, and Schmidt (1986); Hunter (1983); Kramer (2009); Martinussen (1996); McLaughlin, Rossmessl, Wise, Brandt, and Wang (1984); Pearlman, Schmidt, and Hunter (1980); Salgado and Anderson (2002, 2003); Salgado, Anderson, Moscoso, Bertua, and de Fruyt (2003a); Salgado, Anderson, Moscoso, Bertua, de Fruyt, and Rolland (2003b); Schmidt, Gast-Rosenberg, and Hunter (1980); Schmidt, Hunter, and Caplan (1981); Verive and McDaniel (1996); Vineberg and Joyner (1982); Zeidner (1987) – a few recent meta-analyses were not included due to the cognitive ability classification system employed (e.g., Alonso, 2000; Postlethwaite, 2011), or because they were the only source reporting on a certain criterion (e.g., Gonzalez-Mulé, Mount, & Oh, 2014).

become a primary concern. IWO psychologists routinely investigate group differences on various predictor and criterion measures when collecting construct-related validity evidence and to demonstrate fairness of their assessment tools. In this regard, cognitive ability tests have received an inordinate amount of research (and public) attention, especially in the US. Most of it has focused on race and ethnic group differences (Hough, Oswald, & Ployhart, 2001). Other important demographic differences (e.g., gender) have also been explored, some of them only relatively recently (e.g., age).

A comprehensive review of the legal context relating to group differences in cognitive ability measures cannot be offered in this chapter. The groups that constitute protected classes – majorities versus minorities, traditionally disadvantaged versus treated preferentially – not only differ from country to country but are also highly dynamic. Demographic changes have made older workers the majority in many industrialized countries. Shifting and increasing migration is changing the makeup of societies and workforces throughout entire continents; the influx of Syrian refugees to Europe is but one current example. In 2015, worldwide refugee numbers were estimated at 60 million by the

United Nations High Commissioner for Refugees. Moreover, modifications and new interpretations of civil rights law are leading to recognition of previously unrecognized classes, many of which are rarely included in demographic breakdowns and research on group differences (e.g., non-binary gender persons). Interested readers are referred to the excellent summary and update provided by Sackett, Shen, and colleagues (Sackett et al., 2010; Shen et al., 2017), as well as the chapter by Tison, Pryor, Aamodt, and Dunleavy (2017), which provides an overview of protected classes and how laws have developed internationally over time.

Gender, age, race, ethnic, and national origin are among the protected classes that are consistently included in employment and general anti-discrimination laws worldwide (see Shen et al., 2017). They also represent the most researched demographic categories related to cognitive ability group differences. Examinations of group differences on *any* assessment tool used to make admission or hiring decisions are tremendously important. However, the vast majority of group differences research has been conducted using scores on standardized cognitive ability tests. Information for alternative assessment methods

is rarely available on the construct level (e.g., group differences in problem solving as assessed by assessment centers, or on cognitive dimensions assessed by employment interviews). Thus, this section focuses on race-, ethnic-, gender-, and age-group differences in standardized test scores.

Relevance for Workforce Diversity

When test or assessment scores are used to make selection decisions in a strictly top-down manner (i.e., choosing the highest scorers from a ranked list), group differences can result in disproportionate representation of individuals from various groups in the final pool. The impact on pool composition and diversity depends on the magnitude of group mean-score differences, score variability in the groups, and selectivity of the organizations (i.e., how many individuals get picked from a group of candidates). There are many definitions of fairness, and no unifying international standard exists. In the US, the notion of adverse impact is central to the concept of fair test use. Presence of adverse impact (when the selection ratio of one group is less than four-fifths of that of another) triggers a more thorough review of selection systems and tools. Other countries have similar rules relating to test use in employment settings. However, it is important to note that workforce diversity (or lack thereof) is not solely a function of the test employed, but how scores are used in decision making (including issues such as norms applied, score banding, combinations with other predictors, means of data combination, etc., see Potosky, Bobko, & Roth, 2005; Roth, Bobko, & Switzer, 2006; Sackett & Roth, 1996, for examples). Knowledge of group differences on a given predictor is crucial because it allows us to properly estimate implications of test use for workforce diversity in a given context.

In IWO psychology, group mean-score differences are typically indexed using Cohen's d , which expresses differences between means in terms of standard deviation units. For example, a group difference of $d = 1.00$ indicates that the means of two distributions are one standard deviation apart. (An alternative way to express this would be to say that the 'average' member of group A scored higher than 84% of members of group B, assuming that scores in both groups are normally distributed.) Based on often-cited rules of thumb, d values of .80 or greater are considered large effects, those around .50 are moderate, and those below .20 are small (Cohen, 1977). However, better guidelines for practical meaning of such effects would consider the implications of group differences for a

variety of outcomes instead. For example, while d values under .20 are often trivial, in some cases (e.g., when the majority group selection ratio is less than 1%), such small differences can lead to disproportionate hiring of individuals from different groups. We must keep in mind that such scenarios are not rare – for desirable positions, the number of applicants can easily exceed the number of available positions hundred- or thousand-fold.

Race, Ethnic, and National Origin

Race and ethnic group differences have received more attention than any other demographic characteristics in relation to cognitive ability. Data and findings from several meta-analyses were summarized by Ones, Viswesvaran, and Dilchert (2005b). Most of the data contributing to these studies were collected in the US. Across industries and occupations, on tests of GMA, Blacks score about one and Hispanics/Latinos about four-fifths of a standard deviation unit lower than Whites (Roth, Bevier, Bobko, Switzer, & Tyler, 2001). Group differences on specific ability tests tend to be slightly smaller (see Ones et al., 2005b). The same is true among applicants to high-complexity jobs; this is probably due to attraction and self-selection effects as well as stricter minimum requirements in terms of educational credentials (Ones et al., 2017).

The White–Black and White–Hispanic differences observed on standardized cognitive ability tests in educational and occupational settings are at the root of what has been termed the 'validity-diversity dilemma' (Kravitz, 2008; Ployhart & Holtz, 2008; Sackett, De Corte, & Lievens, 2008). Standardized tests of cognitive ability are the single most valid predictor of success in both settings. However, White–Black and White–Hispanic group mean-score differences are large enough to result in significantly reduced diversity if cognitive ability tests are used as the sole factor upon which selection decisions are based. Of course, as discussed above, that is rarely the case. Cognitive ability tests might serve as an initial hurdle, or can be combined with scores on other predictors in a compensatory manner. Group differences on other selection methods are less frequently examined; however, comparative data are available for overall interview evaluations (Huffcutt & Roth, 1998), for example. Both in terms of White–Black and White–Hispanic comparisons, interviews exhibit lower group mean-score differences, and thus offer the potential to reduce overall impact of the system. Interestingly, parallel to standardized tests, group differences on interview ratings

are smaller (or favor minority candidates) when interviews are conducted for high-complexity jobs. Differences are larger for unstructured interviews (whose scores also correlate more strongly with tests of cognitive ability) and when cognitive ability interview saturation was judged to be high. Detailed knowledge of group mean-scores among all relevant groups and on all potential predictor measures is important to minimize adverse impact in selection system design.

It is concerning that similarly robust data on Asian Americans, Native Americans, as well as many other internationally protected groups are not available, at least not from occupational settings. Meta-analyses or even large-scale within-job examinations (important due to differential attraction, selection, and attrition effects for the groups) are hard to find. As Ones et al. (2017) point out, response categories in psychological research (but also applied settings) often subsume individuals from heterogeneous backgrounds in the same category, which complicates systematic research in this regard. The general psychological and educational literature report slightly higher cognitive ability test scores for Asians and sizably lower scores among Native Americans compared with majority group members (Gottfredson, 1997a; Humphreys, 1988). Similar studies in occupational settings are rare to nonexistent.

As discussed above, protected classes and subgroups differ across countries (Tison et al., 2017). Outside the North American context, with some exceptions, few systematic studies of race and ethnic group differences on cognitive ability have been conducted. Dilchert and Ones (2007; see also Ones et al., 2017) reported unique, country-level score comparisons for a large nonverbal cognitive ability testing effort using consistent instrumentation. Applicants from countries in the Confucian Asia and southern and northern Europe cultural clusters scored highest on average. Salgado (2017) provided a useful summary of within-country studies from Australia, Israel, New Zealand, South Africa, Taiwan, Turkey, and The Netherlands. Not all of these studies have focused on ethnicity; some examined immigration status instead. Findings are consistent in terms of showing lower cognitive ability mean-scores for traditionally disadvantaged groups.

Gender

Gender differences on GMA are negligible. This might seem trite, especially to IWO psychologists who have long assumed that gender differences in cognitive ability are inconsequential (Ployhart & Holtz, 2008). However, few studies or meta-analyses

have investigated differences in GMA, compared with differences in specific ability. Two notable exceptions using large, representative samples and diverse ability batteries are the studies by Colom, Juan-Espinosa, Abad, and García (2000) and Deary, Irwing, Der, and Bates (2007). Both concluded that differences in *g* were very small. However, Deary and colleagues also confirmed notably different variability for both groups, resulting in a higher proportion of men among top-scorers (among the top two percent of the joint distribution, men were represented at twice the rate of women).

Negligible to small differences have also been established for most – but not all – specific cognitive abilities. Gender differences on quantitative ability measures have decreased over time (compare the meta-analyses by Hyde, 1981 and Hyde, Fennema, & Lamon, 1990). Nonetheless, some of these differences reach levels of about one-third of a standard deviation unit, favoring men. An opposite pattern has been established for specific verbal ability measures, where women score higher on average on select, specific abilities (Hyde & Linn, 1988).

These relatively small and balanced findings do not mean IWO psychologists can neglect gender when it comes to workforce diversity and cognitive ability test use. First, there are other specific ability tests where moderate to large gender differences exist. These tests might not be used for the majority of jobs, but are administered with some frequency in specialized occupations. Visual-spatial ability measures, particularly mental rotation and spatial perception, exhibit large group mean-score differences, with men scoring about 0.40 to 0.70 standard deviation units higher than women (Irwing & Lynn, 2005; Lynn & Irwing, 2004; Schmidt, 2011). Second, even in the presence of small group mean-score differences, variability differences between men and women would mean that in most realistic selection scenarios (i.e., competitive labor markets where selection ratios are low), men would get selected at somewhat higher rates than women. In addition to the findings by Deary and colleagues (2007) reviewed above, meta-analyses have further established such differences (see summary provided by Hyde, 2014, Table 2). Male/female variance ratios range from 1.03 to 1.16 for verbal abilities, 1.05 to 1.20 for mathematics abilities, and 1.27 for spatial ability, among representative samples in the US. These variability differences result in higher proportions of men scoring in the very top parts of cognitive ability distributions. It has been posited that the under-representation of women in STEM fields is at least in part due to these differences (Lubinski, 2010). In sum, while there are few if any gender differences in average GMA, score distributions on some measures (means and

variances) require close attention. Organizations that rely on specific ability measures, particularly visual-spatial ones, should pay close attention to gender differences if they are concerned with proportionate workforce representation.

Age

Longitudinal psychological research has established two important findings related to age and intellectual development. First, rank-order differences in intellectual abilities exhibit high temporal stability (see the impressive results of the Scottish Mental Surveys, for example; Deary, Whalley, Lemmon, Crawford, & Starr, 2000; Deary, Whiteman, Starr, Whalley, & Fox, 2004). Second, cognitive abilities generally decrease with age, and different trajectories characterize general mental and specific abilities (see the body of work summarized by Schaie, 1994, 1996).

Findings on rank-order stability of cognitive ability are particularly important to the science and practice of employee selection. Applicants who exhibit high cognitive ability at the time of hire can be expected to remain in the top of their cohort's ability distribution throughout their careers. However, cohort differences can have a meaningful impact on workforce diversity if cognitive ability is used in employee selection. Furthermore, other areas of IWO psychology (e.g., training) would benefit from increased awareness of age differences in cognitive ability.

One of the largest investigations of cognitive ability age differences across the working lifespan was conducted by Avolio and Waldman (1994), who reported data for more than 25,000 job applicants obtained using the US Employment Service's General Aptitude Test Battery (GATB). Ones and colleagues (2017) computed *d* values based on age group descriptives reported by Avolio and Waldman. Notable group mean-score differences exist when comparing 35–44-year-olds to younger applicants. Differences are even larger when contrasting 45–55 and 55–65-year-olds to younger candidates; standardized mean-score differences range from 0.80 to 1.50. The smallest differences were observed for verbal ability. In a large sample of managerial job applicants, as well as replications in several representative general population samples, Klein, Dilchert, Ones, and Dages (2015) showed that some crystallized abilities actually *increased* during individuals' working lifespan. However, they also showed that declines in GMA and most other specific abilities (most importantly inductive reasoning) are large and can be documented as early as 40 years of age.

Organizations that use cognitive ability tests in admissions or selection decisions should be aware of the specific pattern of cognitive ability group differences on tests they employ. Notable age differences on some ability measures that pose a threat to age-based workforce diversity might be buffered by including certain measures of verbal or general mental ability that exhibit less age-related decline. In addition, training and other organizational interventions aimed at mature employees should consider the unique developmental trajectories established by this research and the psychological literature on aging.

Some general conclusions can be drawn from the findings on group differences across various protected classes. There is no easy recipe for avoiding adverse impact on all or even most subgroups of protected classes. Race and ethnic group differences in GMA are large. Some meta-analytic data suggest that adverse impact might be reduced by relying on specific ability measures, which sometimes exhibit smaller subgroup differences. At the same time, gender and age group differences can increase at the level of specific abilities, depending on the specific ability in question. In terms of workforce productivity, the use of GMA tests (rather than specific ability measures) is indicated when designing assessment systems spanning several occupational categories and broad job performance criteria. At the job-level, organizations might be able to achieve similar levels of validity with the use of several specific ability measures, or increment validity of GMA tests to a small degree (Schneider & Newman, 2015). However, these tests are unlikely to completely eliminate race- or ethnic-group-based adverse impact, and some of them (e.g., spatial ability and inductive reasoning measures) hold potential to exclude women and older candidates at significantly higher rates. In addition to knowledge of group mean-score differences typically encountered on various measures (obtained from both the scientific literature and relevant test manuals), organizations should pay close attention to the composition and human capital characteristics of their applicant pools if they want to design assessment systems that maximize both productivity and diversity.

PAST CHALLENGES AND FUTURE OPPORTUNITIES

Cognitive ability assessment has a more than century-long history in applied psychology. Since Spearman's (1904) discovery of the general factor, our field has seen many challenges with regard to

cognitive ability measurement in organizations. Assessment trends have come and gone, but some have made a lasting impact and changed our science and practice for the better.

Until the 1970s, the belief in situational specificity of cognitive ability test validity slowed scientific progress. Our field saw a proliferation of specialized cognitive ability tests developed for unique occupations and industries, which in turn hampered systematic development of cumulative knowledge. However, these circumstances also led to enormous growth in the number of validation studies and eventually spurred the development of meta-analytic techniques for validity generalization (Schmidt & Hunter, 1977; Hunter & Schmidt, 1990). Without the large number of situation-specific validation studies (and the many moderator analyses they enabled), our understanding of cognitive ability would be sorely lacking. Without the need to investigate generalizability of effect sizes, meta-analytic techniques might not have developed into what they are today. Our understanding of the biasing effect of statistical artifacts has improved, and many other IWO fields have benefited as a result (Hough & Dilchert, 2017). Today, meta-analysis is the *de facto* standard for summarizing knowledge in any scientific domain (Christiansen, Seltzer, Beatty, & Ones, 2009), and its techniques have spread far beyond the shores of IWO psychology (Schmidt & Hunter, 2014).

The 1990s saw debates regarding the relative value of specific versus general mental ability (see Olea & Ree, 1994; Ree & Earles, 1991; Ree, Earles, & Teachout, 1994). The debate was shaped by HR objectives at that time. Personnel selection was the focus, and prediction of job performance was the goal. There is no doubt that tests of GMA are the single best predictor of overall training and job performance criteria across jobs. Many organizations make use of this principle by designing broad-based ability assessments that are administered early in the selection process to all job applicants, regardless of position (see Gibby et al., 2009, for example). However, beyond maximizing performance, our goals have broadened to include criteria such as applicant reactions and workforce composition. While cognitive ability tests in general elicit moderately positive reactions, specific ability tests are perceived as particularly face valid when matched to the job in question. However, contrary to what some had hoped, they do not provide a simple solution to the issue of group differences. Patterns of mean-scores vary widely for different protected classes. However, by now, enough data are available to facilitate thoughtful assessment system design. Of course, it is not possible to measure specific cognitive abilities without measuring GMA (Ones

et al., 2005b). But organizations that conduct the appropriate research on applicant pools and predictor scores can combine specific ability tests that together approach the overall validity of GMA while potentially improving workforce diversity.

In addition to specific abilities, 'new abilities' have come and gone. Twenty years ago, IWO psychology was debating whether practical intelligence is independent from 'book smarts' (Sternberg, 2000) and whether emotional intelligence 'matters more than IQ' (Goleman, 1996). We have since learned to better distinguish constructs from assessment format (McDaniel et al., 2007), and to more fully consider the role of statistical artifacts, such as measurement error and range restriction, when evaluating the benefits of newly proposed constructs. Practical intelligence tests correlate highly with GMA (Dilchert & Ones, 2004), and emotional intelligence is a construct better placed in the non-cognitive domain (Joseph & Newman, 2010; Van Rooy, Dilchert, Viswesvaran, & Ones, 2006; Van Rooy & Viswesvaran, 2004). However, real improvements have been made when it comes to our understanding of cognitive ability. Early, empirically based taxonomies (Carroll, 1993) have been further extended and supplemented with content-based and nomological net clustering approaches (see Stanek & Ones, Chapter 13). Carroll's work was invaluable in helping our field understand the hierarchical structure of cognitive abilities. The taxonomy and compendia offered by Stanek and Ones will enable further sophisticated research and construct-based analysis of cognitive ability tests in organizational settings.

Cognitive ability item types, assessment format, and testing modes have experienced few changes over the course of 100 years. Comparing item types on some of the early mass tests of cognitive ability (e.g., Yoakum & Yerkes, 1920) with commercial tests available today will yield more similarities than differences (e.g., Bennett, Seashore, & Wesman, 1989; Ruch, Stang, McKillip, & Dye, 2001; Wonderlic, 2000). However, the last 20 years have brought major changes in information systems that have fostered a new wave of innovation in testing methods and technology. First, computer-based test administration (see Mead & Drasgow, 1993, for an early review) provided advantages of accuracy and efficiency in scoring. Next, computerization, together with developments in item response theory, allowed for the construction of adaptive tests. The departure from conventional fixed-length tests provides the advantage of higher precision of score estimates at all parts of the ability continuum (Weiss, 2011). Moreover, computer adaptive testing has facilitated another big trend in IWO psychology:

online delivery in unproctored settings. Although conventional tests are also delivered online, computer adaptive testing provides additional security advantages as exposure of the item pool is more tightly controlled and individual (compromised) items can be easily interchanged (Gibby et al., 2009). Recent survey results show that fewer than 20% of companies globally use adaptive testing at this point (Ryan et al., 2015). However, increasing needs for internet-based testing, especially for companies that source a large proportion of international or nonlocal applicants, will certainly increase demand for such tools. As a result, new tests are constantly being developed, and some of the most established, well-documented, and empirically supported tests in our field are being adapted in this way (see Raven, 1938; Pearson, 2015, for example). While many traditional item formats are suitable for this purpose, the increasing prevalence of mobile communication devices will require development of additional item types and response formats that can be reliably used on small screens, with touch-sensitive inputs, and under timed conditions.

Finally, the potential of cognitive ability assessment to contribute to workforce productivity is not limited to the organizational level. Economies and societies worldwide are facing demographic changes that will require a reevaluation of human capital and its optimal use. In addition to increasing numbers of women, ethnic minorities, and older individuals in the workforce, Ones and colleagues (2017) have identified increasing migration as a potential challenge and opportunity. Productivity and well-being of national economies and societies will depend on successful integration of immigrant populations in the future, including in the educational and occupational realm. Assessment tools, including cognitive ability tests, can help in making optimal use of their human capital.

Ten years ago, in a review on staffing for the twenty-first century, Ployhart (2006) compiled a list of questions our science needs to answer regarding the use of well-developed predictors, particularly cognitive ability tests: 'What barriers exist to organizations adopting different predictors? What influences decision makers' choices about using predictors? Why is evidence for these predictors so frequently discounted?' (p. 883).

One lesson our field has learned is that organizations and practitioners are not persuaded by criterion-related validity evidence alone. If that were the case, every organization would use a standardized cognitive ability assessment in their admissions or hiring process – for all opportunities, for all jobs. Ultimately, decisions of predictor constructs and assessment methods must consider scientific evidence, organizational values, as well

as economic and societal contexts. It is the responsibility of IWO psychologists to make such evidence available and help organizations make the most responsible decision in a given context.

Cognitive ability tests are among the most powerful weapons in the IWO psychology arsenal. The analogy might be crude, but it is apt. We must weigh a variety of factors regarding their deployment: effectiveness, efficiency, and consequences (including applicant reactions and workforce diversity). However, we must also consider the consequences of not deploying a reliable and valid predictor tool at our disposal – including reduced objectivity, lowered productivity, and insufficient societal benefit – especially when resources to be distributed (educational opportunities, jobs) are scarce.

Notes

- 1 To inform comparisons of construct-level overlap between results obtained from different assessment methods, corrected (true-score) correlations are provided in this section, where available. However, it should be noted that to inform questions such as predictor tool combinations for prediction of various criteria (and computations of joint or incremental validity), uncorrected (observed) correlations between scores obtained from different assessment methods should be considered.
- 2 Use of dimension-based, rather than overall scores, will also have positive implications for operational and incremental validity offered by assessment center scores (Dilchert & Ones, 2009).
- 3 Computerized or online-delivered interviews are also beginning to be offered commercially, and several attempts have been made to develop online assessment centers. The latter seem to be limited to individual simulations or exercises, such as an online in-basket.
- 4 It is important to stress that their meta-analysis focused on criterion-related validity, and thus these results do not preclude the existence of situational judgment tests developed to assess ability constructs in general – they just indicate that no criterion-related evidence exists that met the inclusion criteria of this meta-analysis (i.e., construct-level validities available).
- 5 Some meta-analyses summarized in Tables 9.1 to 9.3 reported results for other specific cognitive ability or subject-specific knowledge tests. Very often the operational validity of such knowledge tests meets or exceeds that of total (GMA) test scores (see Kuncel, Hezlett, & Ones, 2001). These results are not summarized here because too few meta-analyses consistently reported operational validity estimates for these subtests.

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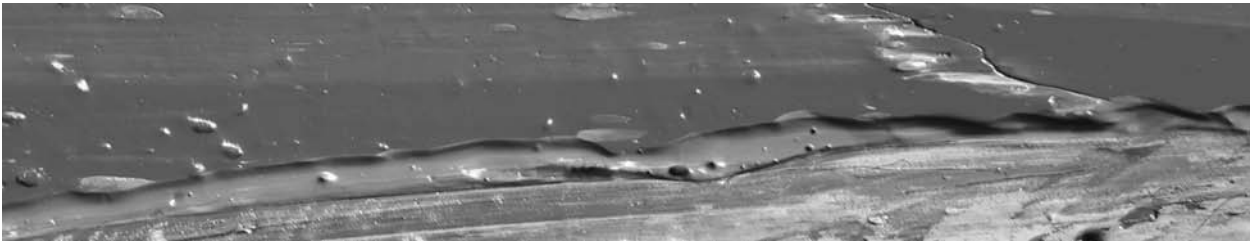
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PART III

Individual Differences and Capabilities



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Job Knowledge: Its Definition, Development and Measurement

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INTRODUCTION

Job knowledge is an important determinant of job performance (Campbell, Gasser, & Oswald, 1996). Job knowledge assessments generally boast validity coefficients that are on par with, and sometimes better than, general mental ability assessments, which are typically thought to be the best predictors of job performance (Schmidt & Hunter, 1998). Nonetheless, research and theory on job knowledge appears to be relatively sparse when compared to that related to cognitive ability. Certainly, valid reasons exist for the focus on ability. Relative to ability, assessment of job knowledge is complex and idiosyncratic and must be considered within the context of each individual job. One major limitation of using job knowledge measures in selection is that applicants cannot be expected to have job experience and knowledge for a job they don't yet have (Dudley-Meislahn, Vaughn, Sydell, & Seeds, 2013). In the absence of job experience, then, general mental ability (GMA) is a useful index of what a person can learn in a job (Schmidt, Hunter, & Outerbridge, 1986). That is, GMA is an index of how much job knowledge a person can acquire through experience (Dudley-Meislahn et al., 2013), which makes GMA a more generally useful predictor of job

performance, even if validity coefficients may be slightly higher for job knowledge than GMA measures (Schmidt & Hunter, 1998).

Although GMA is a useful predictor of job performance because it provides an index of what a person can learn, ability measures are somewhat mismatched to the job performance criterion in that they represent *maximal performance*, or what a person can do when putting forth his or her best effort. Although there are situations in which the prediction of maximal performance would be desired (e.g., astronaut on a high-profile mission, concert pianist), most organizations are more interested in predicting *typical performance*; that is, how a person will perform over the course of a typical day, month, or year on the job (Ackerman, 1994; Beier & Ackerman, 2012; Sackett, Zedeck, & Fogli, 1988). Matching predictor to criterion in terms of content and breadth will maximize the correlation between them (i.e., Brunswik symmetry; Wittmann & Süß, 1999), which explains the relatively high predictive validity of job knowledge measures (Schmidt & Hunter, 1998). The context in which cognitive ability measures are administered in selection (i.e., high-stakes testing) and the instructions that accompany these assessments (i.e., do your best) are designed to elicit maximal performance from test-takers. By contrast, knowledge measures represent the amount of knowledge

a person acquires over time through education and experience, which can be considered a function of a person's typical approach for engaging intellectually within their environment. As such, knowledge measures can provide an index of typical performance more than cognitive ability measures can (Ackerman, 1994). The value of job knowledge assessment has not gone unnoticed by selection professionals. In an informal survey of I/O practitioners, Ryan and Ployhart (2014) found that practitioners are extremely interested in developing and validating job knowledge measures for use in selection contexts.

In the process of writing this chapter, we evaluated the state of research and practice on job knowledge and found that it is thriving. This conclusion may surprise some who consider job knowledge narrowly to include only assessments of declarative and procedural knowledge of specific tasks in a particular job (Schmidt & Hunter, 1998). It would be a mistake, however, to confound a particular *method* of job knowledge assessment (e.g., specific to particular tasks within a specific job) with the *construct* of job knowledge. Indeed, most measures of job knowledge reviewed here are *method-driven* predictors, meaning that the focus has been on the assessment itself with little attention to the construct it measures (e.g., situational judgment tests [SJTs], interviews, biodata). This is in contrast to *construct-driven* predictors that focus on constructs with little regard to method (e.g., GMA, personality; Arthur & Villado, 2008; Lievens & DeSoete, 2012).

In summary, measures of job knowledge that sample content from a specific task for a particular job are just one way that organizations assess job knowledge. Recent research examining the construct validity of an array of popular selection methods (interviews, resume reviews, work samples, SJTs, and assessment centers) suggests that one of the central constructs that many of these methods assess is job knowledge (Dudley-Meislahn et al., 2013; Huffcutt, Conway, Roth, & Stone, 2001; Motowidlo & Beier, 2010; Motowidlo, Hooper, & Jackson, 2006a, 2006b; Schmitt & Chan, 2006). In summary, the focus on method over constructs may have obscured the importance of the job knowledge construct in selection (Arthur & Villado, 2008; Binning & Barrett, 1989).

The purpose of this chapter is to review and discuss the theoretical and practical importance of job knowledge in Industrial and Organizational (I/O) psychology. As part of this review, we delineate the construct of job knowledge from its measurement. First, we define and provide a taxonomy for the construct of job knowledge. In our discussion of the job knowledge construct, we present

a model of its development that helps explain its relationships with other constructs important in the selection context (e.g., GMA, personality traits). We then review current research and theory on job knowledge measurement in selection contexts and some special circumstances for understanding job knowledge in teams. We conclude by presenting ideas for future research on both the construct and the measurement of job knowledge.

JOB KNOWLEDGE DEFINED

Industrial and organizational psychologists describe the person-attributes related to doing a job as a person's *knowledge, skills, abilities*, and sometimes *other* non-ability characteristics such as personality, motivation, and interests. Knowledge is defined as the way in which key facts, principles, and other information pertaining to a particular domain is organized, including both declarative and procedural types (Gagné, 1984). For the purposes of this chapter, the domain in question is the work domain, which includes both task-related knowledge (knowledge about people, data, and things), and knowledge that affects the environment in which work is conducted (i.e., contextual knowledge; Borman & Motowidlo, 1993). Figure 10.1 shows a framework for understanding the types of knowledge relevant to workers and organizations.

Across the top of Figure 10.1 is knowledge type: Declarative knowledge is defined as knowledge about a topic, which includes anything from relatively isolated or disconnected facts (e.g., the names and birthdates of US Presidents), to complex interconnected networks of information that form an in-depth understanding of a domain (e.g., the way the US Federal Government operates). Gagné (1984) called this type of knowledge *verbal information* to denote that evidence for its existence is generally provided through verbal descriptions. Procedural knowledge, by contrast, includes sequential steps informed by concepts, rules, and procedures (Gagné, 1984). Evidence for procedural knowledge is generally shown through actions – it is demonstrated through what a person *does*. We include both intellectual skill (e.g., speaking, writing, using calculus to determine building specifications, managing a project) and motor skill (e.g., typing, driving a car, roofing a building) in our consideration of procedural knowledge and use the terms procedural knowledge and skill interchangeably.

Figure 10.1 also shows a distinction between task and contextual knowledge to highlight the

		Type of Knowledge	
		Declarative	Procedural
Domain	Task	Knowledge about work-relevant information and tasks. Examples: The organization's revenue goal for the current year. The best type of manufacturing equipment. The type of training workers need to execute their jobs. Assessment: Interviews, knowledge tests (multiple choice, essay, short answer)	Knowing how to carry out work-related tasks. Examples: Managing a project. Writing a report. Calculating the maximum load for a truck. Driving a truck. Attaching doors to a vehicle on an assembly line. Assessment: Interviews, work samples, situational judgment tests
	Contextual	Knowledge about the factors that affect the context in which work gets done. Examples: The organization's goals for increasing diversity. The average age of employees. The percent of employees who feel encouraged to participate in training and development activities. Assessment: Knowledge tests (multiple choice, essay, short answer), interviews	Knowing how to affect the context in which work gets done. Examples: Conducting a discussion about unsatisfactory performance with a subordinate. Motivating colleagues to participate in an extra project. Recognizing the accomplishments of a colleague. Assessment: Interviews, work sample; situational judgment tests

Figure 10.1 A taxonomy of knowledge relevant to job performance

types of knowledge that lead to different types of performance (Motowidlo, Borman, & Schmit, 1997). Task performance is generally defined as behaviors that affect the technical core of the organization. Examples of this type of performance include producing a product, delivering a presentation, and writing a report. Contextual performance, by contrast, is related to behaviors that support the organizational, social, and psychological environment (i.e., the context in which the work gets done; Borman & Motowidlo, 1993). Examples of contextual performance include treating others with empathy, dignity, and respect while engaging in work, and organizing a celebration of the accomplishment of a milestone within a work group. Although the task and contextual performance distinction is a convenient way to consider different types of knowledge, sharp distinctions between the types of knowledge related to task versus contextual performance may not be possible. We include, for instance, interpersonal procedural knowledge in the contextual domain because it seems relatively intuitive that this type of knowledge would contribute to the social and psychological environment of an organization.

This would include, for example, knowledge about how to make people feel valued and welcomed in an organization. Whether or not this knowledge is related to task or contextual performance depends, however, on the job. Interpersonal knowledge would be considered task-related for jobs where people-related activities comprise the core activities (e.g., managers and customer service representatives), but would be relatively less task-related and more contextual-related for jobs that have fewer people-related activities (e.g., computer programmers).

Crossing procedural and declarative knowledge with task and contextual domains produces four quadrants of knowledge as shown in Figure 10.1. Task-related declarative knowledge is knowledge about work-relevant information and tasks, which can include information that is specific to an organization (e.g., the organization's revenue goal for the current year) or more general information relevant across organizations (e.g., the best type of equipment to purchase for a specific task). Task-related procedural knowledge includes knowledge about how to execute work-related tasks, which can also be specific to an organization

(e.g., completing internal budget forms), or more general (e.g., constructing a budget). Contextual-related declarative knowledge is about the factors that affect the organizational context, which can also be organization-specific (e.g., the size of a particular organization) or broader (e.g., the average age of the workforce in a particular industry). Procedural knowledge related to contextual performance is a person's knowledge about effective and ineffective behavior that affects interpersonal relationships at work and the organization's climate and culture. An example of organization-specific knowledge in this area would be showing deference to a senior manager during a meeting given the unique personalities involved; an example of knowledge relevant across organizations is knowing that public acknowledgment of the contributions of subordinates will usually enhance employee morale.

RELATED CONSTRUCTS: TACIT KNOWLEDGE AND EMOTIONAL INTELLIGENCE

Researchers have actively examined constructs relevant to success in everyday environments, including the workplace. Two constructs that have received wide research attention across applied psychology, and that are particularly relevant to job-related knowledge broadly defined are tacit knowledge (Wagner & Sternberg, 1985) and emotional intelligence (Salovey & Mayer, 1989). Here we review these two constructs; comparing and contrasting them with job knowledge.

Tacit Knowledge

Wagner and Sternberg (1985) introduced the idea of practical intelligence and tacit knowledge to broaden the context in which intelligence is considered. Practical intelligence is distinct from academic intelligence, which is typically evaluated with conventional intelligence measures (Cianciolo, Grigorenko, Jarvin, Gil, Drebot, & Sternberg, 2006; Sternberg, Nokes, Geissler, Prince, Okatcha, Bundy, & Grigorenko, 2001). Practical intelligence theory is rooted in the theory of successful intelligence (Sternberg, 1999), which defines intelligence in the context of one's sociocultural environment, specifically, one's life success. Under this approach, researchers examine how a person's intelligence and experience interact to help the person fit and function effectively within his or her own

environment. In short, a person's ability to handle problems encountered in everyday life is considered practical intelligence and has been posited to lead to life success.

Tacit knowledge is a specific type of practical intelligence that has important implications for success in the workplace. In laymen's terms, tacit knowledge is referred to as 'street smart' or 'common sense'. More academic definitions describe tacit knowledge as action-oriented knowledge that is useful in practical situations and generally not verbalized or formally learned through direct instruction (Sternberg et al., 2000). In the context of the taxonomy of job knowledge presented in Figure 10.1, tacit knowledge would be considered a type of procedural knowledge that is relevant to both task and contextual performance. That is, in the context of the workplace, tacit knowledge manifests as knowledge about how to get things done (Grigorenko, Sternberg, & Strauss, 2006), regardless of whether the task is job-related (e.g., checking the quality of a finished product) or contextual in nature (e.g., discussing a sensitive matter with a coworker). Tacit knowledge is typically measured using SJTs (Wagner & Sternberg, 1985), but can also be assessed through self-reports, other-reports, performance tests, and interviews (Lievens & Chan, 2010).

Research suggests that tacit knowledge is predictive of performance (Wagner & Sternberg, 1985). In an academic context, it was positively correlated with the research productivity (e.g., number of publications and citations) and prestige (e.g., job rank, employment at a top psychology department) of both psychology faculty and graduate students. Elementary school teachers with higher levels of tacit knowledge were also rated by principals as more effective at handling problematic classroom situations than teachers with lower levels of tacit knowledge (Grigorenko et al., 2006). Furthermore, team- and organization-level tacit knowledge has been linked to increased team performance (Berman, Down, & Hill, 2002) and better organization-level performance (Harlow, 2008). Recent research has also shown that firm-level tacit knowledge is positively related to an organization's innovation performance outcomes (e.g., number of patents, percentage of market share; Harlow, 2008).

Although the idea of practical intelligence or tacit knowledge is intuitively appealing for predicting performance in everyday work and life situations, not all researchers are convinced that tacit knowledge is a novel, unitary construct. Some argue that tacit knowledge is equivalent to job knowledge in work contexts (Schmidt & Hunter, 1993) and redundant with general intelligence (McDaniel & Whetzel, 2005). Similar to other knowledge

constructs, its multi-faceted nature has led to definitional problems (Lievens & Chan, 2010). In sum, the construct space for practical intelligence and tacit knowledge is in need of further clarification (not unlike the other types of knowledge described in the taxonomy presented in Figure 10.1).

Emotional Intelligence

Emotional intelligence (EI) is typically defined as a person's ability to reason about and process emotional information accurately, which includes using emotions and knowledge about emotions to enhance thought (Mayer, Roberts, & Barsade, 2008). The EI literature has been rife with definitional issues, due, in part, to competing models of EI that differ in terms of measurement and prediction. Theoretically mixed models integrate personality and abilities into the definition of EI. As a result, these models tend to be extremely diffuse and difficult to place within a nomological network of ability, knowledge, and personality constructs (Cronbach & Meehl, 1955). Conversely, ability models of EI emphasize a person's ability to solve emotionally relevant problems. Self-report assessments are generally used to measure mixed models of EI, whereas ability models tend toward more objective measures associated with ability and knowledge assessment (Mayer et al., 2008). There are typically three facets of ability-based models of EI that are most interesting to researchers: (1) emotion understanding (knowledge of how emotions combine and change over time and over situations), (2) emotion management (the ability to regulate one's own and other's emotions), and (3) emotion perception (the ability to perceive emotions in oneself, others, and external stimuli such as artwork; MacCann, Joseph, Newman, & Roberts, 2014). SJTs are typically used for assessment in most ability models of EI (MacCann & Roberts, 2008). Each facet of EI can be considered a type of interpersonal knowledge (either declarative or procedural) that develops over time through experiences.

THE DEVELOPMENT OF JOB KNOWLEDGE

Skill Acquisition

Both procedural and declarative knowledge are thought to have similar developmental trajectories and as such, theories of skill acquisition can be used to describe knowledge development (Ackerman, 2007). These theories describe three distinct phases of skill acquisition; the first is the *declarative stage*,

where performance on a task is slow and error prone as people develop an understanding of the skill or knowledge domain. With consistent practice, performance becomes more accurate and faster, and the attentional demands of the task are reduced as the person moves into the *associative stage* of skill acquisition. When routines are well-learned through consistent practice, task execution requires little attention, and the task can be performed while attention is simultaneously devoted to other tasks (e.g., riding a bike while having a conversation). This stage is the *autonomous* or *automatic stage* of skill acquisition (Ackerman, 1988; Anderson, 1982).

Ackerman (1988) identified the ability correlates of performance at each stage of skill acquisition. Cognitive ability – or attentional capacity – is the most important determinant of performance during the declarative stage given the importance of ability for learning new information. Although general ability may continue to be predictive of performance throughout knowledge and skill acquisition, the best determinants of performance at later stages will be narrower abilities that are more proximal in content to the skill being learned (Wittmann & Süß, 1999). For instance, tasks that rely on response time and motor skills (e.g., typing and air traffic control) will be best predicted by perceptual speed and psychomotor assessments at later stages of learning and practice (Ackerman, 1988). Practice and exposure to a domain will also influence the acquisition of declarative knowledge (Beier, Campbell, & Crook, 2010), and existing knowledge in the same or related domain will be most predictive of learning at later stages of knowledge acquisition (Beier & Ackerman, 2005). In summary, both broad GMA assessment and narrower abilities and skills (domain knowledge, perceptual speed, and psychomotor abilities) are predictive of learning and skill acquisition for all types of job knowledge.

Investment Theories

In contrast to skill acquisition theories that describe the learning process after a person is engaged in a domain, investment theories of adult development describe a broader array of determinants that influence the *choice* to engage in learning (Ackerman, 1996; Cattell, 1987). These theories describe ability and non-ability trait determinants of learning and knowledge acquisition as a function of the investment of attentional effort directed by personality and interests toward a domain. For instance, a person who is focused and curious about the way that things work (i.e., a person high in Conscientiousness, Openness to Experience, and Realistic interests) may pursue hobbies related to disassembling, reassembling, and constructing

objects. These experiences would lead to knowledge acquisition in areas that provide general knowledge and contribute to success in engineering or technical careers.

Cattell's (1987) investment theory identified two main types of abilities relevant for adult intellectual development: fluid abilities, which are related to working memory and are implicated in novel problem solving and reasoning (*Gf*); and crystallized abilities, which represent general cultural knowledge developed through experiences (*Gc*). According to Cattell's theory, *Gc* develops through the investment of *Gf* abilities. Ackerman's (1996) theory of adult intellectual development is similar to Cattell's (1987) theory, but highlights the role of non-ability traits for the development of knowledge and broadens the types of knowledge assessed beyond the broad cultural knowledge captured in most assessments of *Gc* to include knowledge relevant to leisure, educational, and job experiences. Ackerman's theory is called PPIK for intelligence Process (i.e., reasoning ability analogous to *Gf*), Personality, Interests, and Knowledge. The theory posits that process components of intelligence are directed through personality and interests to acquire knowledge in a domain. In support of these theories, research has generally shown personality and interests are important determinants of domain knowledge in academic (history, literature, biology) and non-academic (technology, current-events, health) domains (Ackerman, 2000; Ackerman & Beier, 2007; Beier & Ackerman, 2001, 2003; Rolfhus & Ackerman, 1999), and domain knowledge acquisition (Beier & Ackerman, 2005).

In the context of selection and job knowledge, skill acquisition and investment theories account for the correlations between cognitive ability, personality, and job performance (Ackerman, 1988, 1996; Anderson, 1982; Cattell, 1987). In particular, cognitive ability is an important determinant of learning and knowledge acquisition, which in the work context, is a direct determinant of job performance (Campbell et al., 1996; Hunter, 1983, 1986). Personality and interests direct a person's attention (i.e., ability) toward knowledge acquisition within a domain. In sum, the influence of GMA and personality is mediated through job knowledge for predicting job performance.

Dispositional Fit and Implicit Trait Policies

Recently, related theoretical perspectives – dispositional fit and implicit trait policies – have been introduced to address the development of procedural interpersonal knowledge (the lower right

quadrant of Figure 10.1), and to explain the relationship between personality traits and this type of knowledge (Crook, Beier, Cox, Kell, Hanks, & Motowidlo, 2011; Motowidlo & Beier, 2010; Motowidlo et al., 2006a, 2006b). Dispositional fit theory states that a person will have greater knowledge about effective behavior in any given situation when behaving effectively in that situation requires acting in a way that aligns with his or her own personality traits. Furthermore, dispositional fit theory posits that people will default to an interpersonal approach aligned with their own personality traits when they have no prior experience in a given situation (Motowidlo, 2003). For instance, a person high in agreeableness will believe that acting in an agreeable manner will be effective in most situations. Because he or she is likely to have more experience acting agreeably than someone who is low in agreeableness, he or she will also have more knowledge about the effectiveness of acting agreeably. A logical expansion of dispositional fit theory is the theory of implicit trait policies. This theory states that people develop beliefs about the effectiveness of trait expression (starting with their own traits) across an array of situations. These beliefs are called implicit trait policies, which inform behavior across an array of interpersonal situations (Motowidlo & Beier, 2010; Motowidlo et al., 2006a, 2006b).

As described above, implicit trait policies develop via dispositional fit, but they can also develop through experience when a person does not possess the trait in question. For instance, a person who is low in agreeableness may learn that acting agreeably in a given situation (e.g., job interview and sales meeting in the work context; first date in the personal realm) will lead to more favorable outcomes than will expressing their own antagonistic tendencies. In cases where effective behavior depends on expression of traits *not* possessed by the person, underlying personality traits will be less predictive of performance than knowledge acquired through experience. Theories of dispositional fit and implicit trait policies are similar to investment theories (Ackerman, 1996; Cattell, 1987) because they incorporate the idea that distal traits such as personality will direct a person toward particular experiences. They are also aligned with trait activation theories, which state that situations will elicit trait-related behavior by providing cues for what to attend to within these experiences (Tett & Burnett, 2003).

The tenets of investment theory, dispositional fit, and implicit trait policies are integrated in Figure 10.2 to illustrate how general knowledge, job-specific knowledge, and implicit trait policies develop and influence job performance. Most

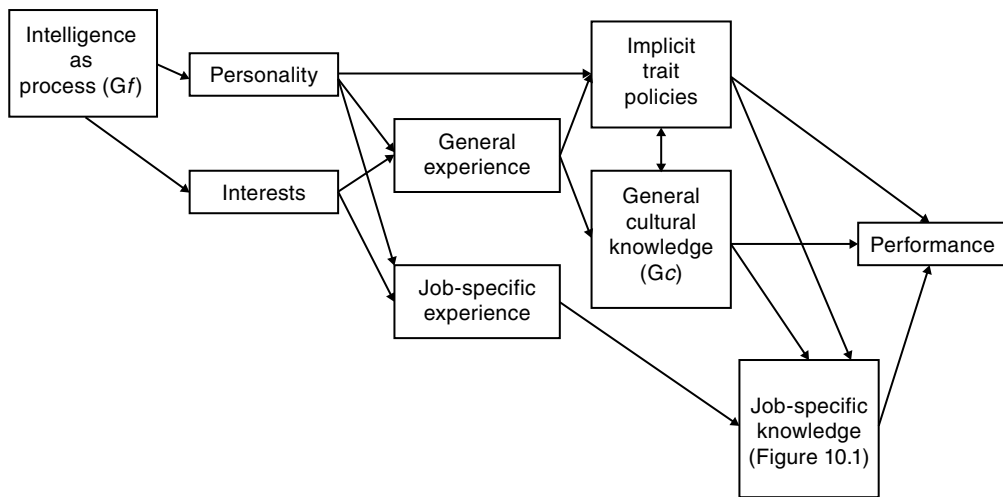


Figure 10.2 Theory of the ability, personality, and interest determinants of general knowledge and job knowledge underlying job performance

importantly, the model provides theoretical rationale for empirical research reporting significant relationships between broad distal traits (personality traits, GMA) and job knowledge measures (e.g., interviews, SJTs, biodata assessments, and so on). The figure can be considered an extension of Hunter's (1983, 1986) model showing job knowledge as the central mediator of the relationship between cognitive ability and job performance, but it has been expanded to include a broad range of knowledge: cultural knowledge acquired through general experience, implicit trait policies (knowledge about the effectiveness of trait expression in a given situation), and job-specific knowledge acquired through job-specific experiences. The model also incorporates PPIK, dispositional fit, and implicit trait theories to show how distal traits such as cognitive ability are directed by personality and interests to a range of situations that, in turn, lead to the development of implicit trait policies and knowledge acquisition (Ackerman, 1996; Motowidlo, 2003; Motowidlo & Beier, 2010).

JOB KNOWLEDGE MEASUREMENT

Valid knowledge assessment is of paramount importance to organizations. Schmidt and Hunter's (1998) review of 85 years of evidence on the validity of selection methods suggests that both direct and indirect measures of job knowledge generally show incremental validity over GMA (Schmidt & Hunter, 1998) for predicting job

performance. Job knowledge measures have the added benefit of being job-related and face valid, which makes them generally accepted among applicants and organizations (Hausknecht, Day, & Thomas, 2004). Below, we review methods for assessing job knowledge in organizations, including those method-driven predictors that one might not typically consider assessments of job knowledge.

Self-Report Job Knowledge: Biodata, Self-Report Measures, and Interviews

The review of applicant information included on resumes and job applications and in interviews are universal selection methods (Dipboye, Macan, & Shahani-Denning, 2012). These are arguably method-driven predictors, however, with relatively little attention focused on the constructs they assess. Below, we describe the relationship between these assessment methods and job knowledge.

Biodata and self-report knowledge

In the review of applications, organizations pay particular attention to applicants' biodata, typically assessed by asking about prior job experience and general education that, because they reflect applicant job experience, training, and education, can be considered proxies for job knowledge (Huffcutt et al., 2001). Although applicants can choose the information they include on a resume, job applications typically include a

standard set of questions that are asked of each applicant and as such, they can be considered biodata measures (a key attribute of biodata being that assessment is standardized; Mumford, Barrett, & Hester, 2012). Similar to other method-driven predictors, there has been confusion about the constructs assessed with biodata measures; some items seem to resemble interest and attitude measures (e.g., do you like engaging in activity X) while true biodata measures focus on experiences (e.g., do you participate in activity X). Regardless of these concerns, most organizations use biodata measures to draw inferences about job knowledge acquired through past experiences; knowledge that will presumably inform future job performance (Mumford et al., 2012). The predictive validity of biodata for job performance can be substantial (e.g., average $r = .35$ for biodata; Schmidt & Hunter, 1998).

In addition to biodata, self-report measures can be valid – although coarse – assessments of job knowledge. These measures simply ask applicants to indicate the extent to which they have knowledge of a particular area (e.g., word processing) on a Likert scale (e.g., $1 = \text{not at all knowledgeable}$ to $7 = \text{very knowledgeable}$; Dudley-Meislahn et al., 2013). An alternative is to ask applicants to identify their level of expertise (e.g., novice/intermediate/expert). Once relevant knowledge domains have been identified for a particular job (i.e., through job analysis), self-report knowledge measures are easily developed. The test developer simply creates a set of summary statements about the job knowledge required for the position and attaches them to a self-report scale. The more an applicant endorses each item, the more knowledge he or she is assumed to have – no item scoring or coding is necessary. As such, self-report knowledge assessments can provide a useful and efficient first pass at identifying promising applicants with job-related knowledge. Although these measures are not as accurate as more objective knowledge assessments, they are easy and cheap to develop (Dudley-Meislahn et al., 2013).

Despite these advantages, organizational concerns about applicant response distortion and faking are relevant for both biodata and self-report knowledge assessments. Further, even when applicants are not purposefully distorting responses, self-report knowledge assessments are influenced by an applicant's self-efficacy in a domain (e.g., an applicant may think that she has exceptional interpersonal skills when in reality she consistently evokes the ire of her coworkers).

Item specificity is another factor that affects the accuracy of self-reported knowledge items. In particular, people are more likely to provide accurate self-assessment when items are specific rather

than general (Ackerman, Beier, & Bowen, 2002). For example, managerial job applicants would likely be more accurate providing an assessment of knowledge about *developing a budget for their work group* than they will for *managing a business unit*. This is because applicants know whether or not they have experience in developing a budget and are more likely to use their prior experience to inform their self-report. By contrast, people may not fully understand which of their prior experiences would provide knowledge related to managing a business unit, which will lead to a less accurate response to that item. As a more general example, people tend to be more accurate in reporting their knowledge of 'calculus' than they are in reporting their 'math skills' because the latter is quite broad and can include an array of skills that one might practice daily; not so with calculus. In summary, self-report assessments are less accurate than more objective assessments (Dudley-Meislahn et al., 2013), which will affect their validity for use in selection (Levashina, Morgeson, & Campion, 2012).

There is evidence that accuracy of biodata and self-report items can be improved through design. For instance, the response elaboration technique asks applicants to provide supporting information (e.g., the name of a reference to verify participation in an activity) along with their responses to self-report items, which seems to reduce the likelihood that applicants will exaggerate their experiences (see Schmitt, Oswald, Kim, Gillespie, Ramsay, & Yoo, 2003 for more information). Research in organizational settings has shown the promise of this approach. Applicants had lower scores on biodata items that required elaboration relative to items that did not (Levashina et al., 2012).

In summary, biodata and knowledge self-reports are valid predictors of job performance, can provide useful proxies for objective knowledge assessments, and can be especially useful tools for initial applicant screening in the selection process. There is also evidence that the effectiveness of self-report and biodata items can be improved through item design. Nonetheless, objective knowledge assessments will be necessary in selection contexts where some level of prior knowledge is essential for successful job performance such as when the job is not easily trained and/or the new hire is expected to execute job tasks on the first day of work.

Interviews

Interview is one of the most frequently used selection methods – second only to the review of applications and resumes (Dipboye et al., 2012). They are appealing to applicants and organizations alike; interviews are an expected event in the

selection process for applicants, and appear to both applicants and managers to be practical, legal, and valid (Dipboye et al., 2012; Hausknecht et al., 2004). Notably, the preference for interviews varies depending on interview structure; both interviewers and applicants prefer unstructured interviews to structured interviews (see Dipboye et al., 2012 for a review). Interview structure is defined as standardization of questions asked and standardized scoring protocol for each applicant. There are many gradations of structure depending on the interviewer and the norms of the organization (Campion, Palmer, & Campion, 1997; Chapman & Zweig, 2005; Huffcutt & Arthur, 1994). Completely unstructured interviews permit latitude in the administration and scoring of interviews, and semi-structured interviews are a hybrid of the two (e.g., an interviewer may start with a standard set of questions and then follow up as he or she feels appropriate).

Increasing structure also increases interview reliability and validity for predicting job performance. In a meta-analysis examining the predictive validity of interviews, Huffcutt and Arthur (1994) found validity coefficients ranging from .20 for unstructured interviews to .57 for high levels of structure including standardized questions with no follow-up questions permitted (corrected for range restriction). In their review of research reporting on the validity of personnel selection measures, Schmidt and Hunter (1998) report similar correlations between interviews and job performance (e.g., .38 for unstructured and .51 for structured interviews).

Interviews tend to include two different types of questions: (1) questions about past experiences (e.g., 'What were your job duties for your previous employer? What were the tasks you completed using Excel?'), and (2) questions related to a hypothetical situation (e.g., 'How would you handle a difficult subordinate? What would you do if faced with a declining market share?', Dipboye et al., 2012). Past-experience questions can be used to assess job knowledge either directly (e.g., when applicants are asked whether they have experiences in a particular domain) or indirectly (e.g., when applicants are asked about courses taken and knowledge is inferred from the response). Past-experience questions in interviews are essentially self-report knowledge assessments administered in a face-to-face conversation between the organization and the applicant. As such, concerns about using these questions are similar to those associated with using any self-report measures in selection (e.g., faking). Nonetheless, there has historically been more concern about applicant faking in the domain of personality assessment than for interviews (Levashina & Campion, 2007). By

contrast, hypothetical situation questions used in interviews are similar to SJTs in that they assess either interpersonal or task-related procedural knowledge by inquiring what a person would do in a given situation.

Similar to other method-driven predictors, there has been some question about the constructs assessed in job interviews. Goals of interviews may vary from one organization to the next (selection, recruitment, assessment of fit with the organization; McDaniel, Whetzel, Schmidt, & Maurer, 1994), and even within organizations, interviewers will have different ideas about the goals of the interview (e.g., whether it should assess existing knowledge or be used as a recruiting tool; Dipboye et al., 2012). Nonetheless, job knowledge has been identified as a central construct assessed in interviews (along with GMA, personality traits, social skills, interests, and physical attributes; Huffcutt et al., 2001). And although interviewers report using interviews most often to assess personality traits, skills related to general intelligence, interpersonal procedural knowledge (i.e., social skills), and job knowledge are regularly assessed in job interviews (Huffcutt et al., 2001). Research also shows that interview structure is related to constructs assessed; structured interviews are more likely to assess job-related knowledge and skills than unstructured interviews (Huffcutt et al., 2001). This may be because structured interviews are more likely to include questions about the knowledge, skills, and abilities (KSAs) identified in job analyses; that is, they are more likely to assess content related to job-relevant tasks than focus on other content that may be less related to job knowledge and performance (e.g., general stories about other job experiences).

Objective Knowledge Tests

Job knowledge measures

Traditionally, tests of job-related knowledge include paper-and-pencil assessments with multiple questions measuring declarative knowledge related to job tasks. Items on these tests can include a display of job-relevant information (e.g., a tool, a dial display, numerical chart, symptom descriptions) followed by a series of questions about the information displayed (e.g., mechanical aptitude tests). These assessments are relatively narrow in that they assess knowledge specific to an occupation, and may be limited because they are difficult to use with applicants who have no prior experience in a job (Schmidt & Hunter, 1998). Nonetheless, job knowledge measures typically account

for variance in job performance over and above cognitive ability measures, and can be useful when applicants would be required to have some level of job knowledge on their first day at work (Schmidt & Hunter, 1998). Recently, the conceptualization of objective job knowledge measures has expanded to include method-driven assessments that, upon further consideration, measure the construct of job knowledge to some extent: work simulations and work-sample tests including SJTs.

Work simulations and assessment centers

Work simulations used in personnel selection are based on the premise that the behavior exhibited in a selection context will be consistent with the behavior that will later be exhibited on the job. Simulations vary on their level of fidelity; high-fidelity simulations generally require applicants to exhibit behavior associated with work tasks, and low-fidelity simulations usually expose applicants to written descriptions or videotaped observations of a work situation and ask them what they would do in response (Lievens & De Soete, 2012). Regardless of fidelity, simulations are often administered in the context of assessment centers.

In assessment center exercises, raters observe applicant behavior and rate that behavior for effectiveness or correctness. Two of the most prevalent exercises used in assessment centers are the in-basket exercise and the leaderless group discussion. In the in-basket exercise candidates are asked to organize a course of action and responses based on the contents of an in-basket (typically an email inbox). Leaderless group discussion exercises typically ask a group of applicants to develop a course of action in response to a given problem. Each applicant in the group is rated for their ability to work cooperatively with others and the effectiveness of the solution developed. Assessment center exercises can be relatively generic and as such, they can be used across business units and organizations (Cascio & Aguinis, 2011). Performance on assessment center exercises likely represents a range of ability and non-ability traits (e.g., personality, ability), but we argue that their most salient underlying construct is procedural knowledge across both task (e.g., in-basket) and contextual (e.g., leaderless group) domains; knowledge that is relevant for performance across an array of jobs.

Work samples

Work samples are similar to assessment centers in that they elicit behavior from an applicant, but they are more specific to a particular job than are assessment center exercises (Cascio & Aguinis,

2011). For example, a work sample for the job of accountant may include an error detection task on a balance sheet; work samples for customer service or sales jobs may require applicants to interact with confederate customers. As these examples imply, work samples can represent task-related procedural knowledge or interpersonal procedural knowledge that would be predictive of job performance. Similar to assessment center exercises, work samples are rated by observers for their effectiveness.

Work samples and assessment center exercises generally show relatively high predictive validity. Perhaps because they are closer in content to a specific job's tasks, validity coefficients for work samples are typically higher than those for assessment centers (average $r = .54$ for work samples versus average $r = .37$ for assessment center exercises; Schmidt & Hunter, 1998). Nonetheless, due to the extensive resources required for both work samples and assessment centers (i.e., the development of the exercises, scoring rubrics, the observer and applicant time involved), organizations have developed less extensive, lower-fidelity simulations in the form of SJTs.

Situational judgment tests (SJTs)

Assessment of situational judgment has a long history in personnel selection (McDaniel, Morgeson, Finnegan, Campion, & Braverman, 2001). The modern form of SJTs was reintroduced by Motowidlo, Dunnette, & Carter (1990) as a low-fidelity method for work-sample assessment. SJTs are comprised of items that describe problematic situations and ask respondents to indicate either what they would do in the given situation or what they should do (Motowidlo et al., 1990). SJTs are typically developed through critical incidents job analysis, which include descriptions of situations and resulting behavior at various levels of effectiveness. These items come in many forms, the most common of which is the multiple-response SJT, which directs respondents to indicate the response they would be most likely and least likely to perform from a list of options. An example of a multiple-response SJT developed for use with tour guides at a children's museum is shown in the left column of Table 10.1 (Crook et al., 2011).

Due to concerns about the dependence of multiple-response SJTs on verbal ability and the time required to develop and administer them, researchers and practitioners have developed and evaluated an array of alternatives including video-based SJTs, which show situations acted out as scenes on videos rather than in written form; open-ended SJTs in which the test-taker generates an original response that is later scored (used mainly in job interviews; Dipboye et al., 2012);

Table 10.1 Example of multiple-response and single-response situational judgment test items from a study of tour guides at a children's museum

<i>Multiple-response situational judgment test</i>	<i>Single-response situational judgment test</i>
You are working at the Information Booth. Some visitors enter the museum with a two-year old child. You: A) Smile but don't interrupt the visitors as they enter to explore the museum B) Offer maps or calendars to them and mention where the Tot Spot area is C) Warn the visitors that some exhibits aren't suitable for the young child and direct them to Tot Spot D) Continue doing whatever activity you were doing In this case, respondents were asked to identify the most effective and least effective response to the given situation, although many alternative approaches for responding and scoring exist.	A family with older children arrived and wanted to visit an exhibit designed only for younger children. The tour guide did not allow them into the exhibit and did not explain the policy that no older children are allowed into the exhibit for safety reasons. In this case, respondents were asked to identify the effectiveness of the behavior described in the scenario on a scale from 1 = very ineffective to 7 = very effective.

Note: Both the multiple-response and single-response situational judgment test (SJT) items were developed for a sample of tour guides at a children's museum (Crook, Beier, Cox, Kell, Hanks, & Motowidlo, 2011 p. 365). Both SJTs were used to assess knowledge in the domain of *welcoming visitors to the museum*.

and single-response SJTs that include a scenario description and behavioral response in one item (Crook et al., 2011; Motowidlo, Crook, Kell, & Naemi, 2009). Single-response SJTs require test-takers to rate the effectiveness of a behavior described in a given scenario on a Likert scale (e.g., from 1 = *not at all effective* to 7 = *very effective*). An example of a single-response SJT developed for the same tour guide sample described above is shown in the right column of Table 10.1 (Crook et al., 2011).

In the three decades since their reintroduction, there has been much debate about the validity of SJTs, especially as related to the underlying constructs they assess (Lievens, Peeters, & Schollaert, 2008; Schmitt & Chan, 2006). This debate has been somewhat settled by researchers who assert that SJTs measure procedural job knowledge (Crook et al., 2011; Motowidlo & Beier, 2010; Motowidlo et al., 2006a, 2006b). Situational judgment tests seem to be particularly well-suited to represent interpersonal dilemmas that elicit a range of behavioral responses that vary on effectiveness. It should be noted however, that SJTs can be designed to assess task-related job knowledge. For instance, an SJT item describing the symptoms of a malfunctioning engine, requiring respondents to identify the most and least effective courses of action from a list of alternatives would assess task-related procedural knowledge for the job of mechanic and not interpersonal knowledge.

Research on SJTs across a range of occupations (tour directors, medical professionals, and volunteers; Crook et al., 2011; Lievens & Sackett, 2012) suggests that these measures can reflect interpersonal procedural knowledge. Moreover,

performance on SJTs has been found to be predictive of effective interpersonal behavior over and above cognitive ability, suggesting that interpersonal procedural knowledge translates into effective interpersonal performance (Lievens & Sackett, 2012). Similar to assessment centers, research on SJTs demonstrates the promise of these measures for assessing interpersonal procedural knowledge that is relevant across occupations, even with applicants who have no prior job knowledge (Motowidlo & Beier, 2010).

Additional Considerations

Subgroup differences in knowledge assessment

Most published research on group differences in selection focuses on Black–White differences in the United States, and so our review reflects these constraints (Bobko & Roth, 2013). We recognize, however, that there are an array of questions not addressed here (e.g., other ethnic-group comparisons; age and gender comparisons; global concerns about subgroup differences) that remain fodder for future research. Job knowledge measures are difficult to create and can be complex in their administration, but an appealing feature of these measures is that they have traditionally demonstrated smaller subgroup differences in performance than have measures of cognitive ability (Hough, Oswald, & Ployhart, 2001).

Group differences are typically indexed with *d*-statistics, which represent the difference in

standard deviation units between mean scores for the majority group versus the minority group (Cascio & Aguinis, 2011). Black–White differences in cognitive ability tests tend to be about 1 standard deviation favoring whites (d of 1.0; Hunter & Hunter, 1984). A difference of this magnitude typically leads to adverse impact in the selection of minorities (i.e., the selection ratio of the minority group does not reach 80% of the selection ratio of the majority group; Cascio & Aguinis, 2011), which can lead to legal and ethical concerns for organizations. Using non-ability measures with smaller standardized differences and weighting predictors differently can help address adverse impact, but when GMA is assessed in selection, adverse impact is difficult to avoid (Hattrup, Rock, & Scalia, 1997). By contrast, job knowledge measures such as SJTs, interviews, work samples, and biodata are typically thought to have smaller group differences in performance (d -statistics ranging from a .25 to .50; Hough et al., 2001). Although these group differences still present problems in selection, knowledge measures have traditionally been considered an improvement over the use of cognitive ability measures in relation to adverse impact (Hough et al., 2001).

A recent review of the literature on subgroup differences, however, highlights that knowledge measures may show more adverse impact than originally thought, due in part to range restriction associated with using incumbent samples in selection research (Bobko & Roth, 2013). Specifically, Black–White differences in job knowledge assessments used with applicant samples tend to be closer to .50 to .80 (standard deviation units), contrasted to the previously reported .25 to .50 range (Bobko & Roth, 2013). Differences are also apparent depending on the type of knowledge assessed; larger differences are found for SJTs that are related to thinking skills and job knowledge (d 's ranging from = .56 to .76; Roth, Bobko, & Buster, 2013) relative to SJTs that assess interpersonal skills (d 's ranging from = .07 to .50; Roth et al., 2013). Similarly, when applicant samples are considered instead of job incumbents, d -statistics for knowledge assessments tend to increase depending on the measures used (d -statistics ranging from around .30 for biodata to .73 for work samples; Bobko & Roth, 2013). Although it is not clear what drives these subgroup differences, there is some evidence that job knowledge assessments that are more highly related to cognitive ability (i.e., measuring thinking skills; speed of processing) will demonstrate larger d -values than those that are

not as strongly related to ability (Bobko & Roth, 2013; Roth et al., 2013). Moreover, SJTs continue to demonstrate smaller group differences – on average – compared to ability tests and thus might be considered a desirable alternative to GMA assessments.

Job knowledge in the context of teams

The focus of the present chapter has been on job knowledge at the individual level, but the issues presented thus far are equally applicable and relevant to teams. More than just a collection of individuals, teams have several qualities that distinguish them. Specifically, a team is a group: (a) where members have specialized roles (i.e., are interdependent), and (b) that performs a specified task or job on multiple occasions such that members will experience working together repeatedly over the life span of the team (Arrow, McGrath, & Berdahl, 2000). As a consequence of team interdependence, an additional layer of complexity is introduced when considering job knowledge – this complexity is apparent in the distinction between the knowledge necessary to complete a task versus knowledge necessary to coordinate team-member efforts. The former is often labeled task-work and refers to the knowledge necessary to perform the requirements of the specific task or job; whereas the latter is labeled teamwork, and refers to the knowledge necessary for cooperative functioning within a team context (Arthur, Villado, & Bennett, 2012; Glickman, Zimmer, Montero, Guerette, Campbell, Morgan, & Salas, 1987). Both task-work and teamwork knowledge are critical to a team's effectiveness.

Task-work knowledge in the context of teams, parallels that in individual contexts: the constructs and the methods by which those constructs are assessed are no different for individuals working in a team versus individuals working alone. For example, an anesthesiologist may work as an individual (e.g., obstetric anesthesiologist) or as part of a team (e.g., anesthesia care team or surgical team). In either the individual or team environment, the declarative and procedural knowledge required is the same. Nonetheless, it is worth noting that the same is not true across team members. Given the specialized roles within a team (e.g., anesthesiologist, surgeon, certified registered nurse anesthetist, operating room nurse, etc.), team task-work knowledge differs across team members. Regardless, within jobs (e.g., anesthesiologist, surgeon, etc.), task-work knowledge at the team level does not meaningfully differ

from that of task-work knowledge at the individual level with respect to constructs assessed and assessment methods (e.g., oral and written examinations). Moreover, because task-work knowledge demands are specific to a particular role within the team, team task-work knowledge offers little generalizability across tasks and jobs. That is, team members may share some general task-related knowledge, but in highly specialized teams, knowledge related to the specific role tends to be highly specialized (e.g., the anesthesiologist wouldn't be able to fill in for the surgeon).

In contrast to the similarity between individual task-related knowledge versus team task-work knowledge, the broad concept of teamwork is unique to team settings. Teamwork focuses on processes vital to team effectiveness, such as cohesion, communication, cooperation, coordination, adaptability, and backup/supporting (Barry & Stewart, 1997; Glickman et al., 1987; Morgan, Glickman, Woodward, Blaiwes, & Salas, 1986). Teamwork competencies are the necessary knowledge, skills, abilities, and other characteristics (KSAOs) that allow individuals to work effectively in team settings and are comprised of various attitudes, behaviors, and cognitions (Salas, Rosen, Burke, & Goodwin, 2009). Teamwork knowledge is what partially underlies these competencies. For example, coordination is the process and sequencing of work within a team (Marks, Mathieu, & Zaccaro, 2001). In order for team members to coordinate their effort, they must know *that* they need to coordinate their effort (e.g., know that it is important to minimize down time) and know *how* to coordinate their effort (e.g., know how to plan work to minimize down time). Consequently, teamwork knowledge may be categorized as being either declarative or procedural in type, similar to task-work knowledge.

The interdependent nature of teams combined with the specialized roles of members within a team highlights the importance of knowledge regarding the strengths (and weaknesses) of team members, otherwise known as transactive memory (Wegner, 1987). In the broadest terms, transactive memory refers to the knowledge team members maintain of each member's domain of expertise. Knowledge of one another's domains of expertise improves coordination by allowing team members to anticipate, rather than react to, each other's actions (Moreland, 1999). This is particularly important for teams required to engage in adaptive performance or to operate in fast-paced environments. Teams with successful transactive memory systems more accurately perceive others' expertise (Moreland, Levine, & Wingert, 1996; Moreland, 1999), which leads

to enhanced team-based outcomes (DeChurch & Mesmer-Magnus, 2010). Unlike teamwork, transactive memory is not generalizable to other teams. Rather, transactive memory is tied to specific team members, making it even less generalizable than task-work knowledge. However, meta-analytic estimates support the relationship between transactive memory systems and team outcomes (DeChurch & Mesmer-Magnus, 2010), and therefore, scientists and practitioners would be wise to retain transactive memory as an important component of job knowledge in team contexts.

In the taxonomy shown in Figure 10.1, teamwork knowledge would be considered in the domain of knowledge that contributes to contextual performance, where the healthy functioning of the team is the focal context. Cohesion, communication, cooperation, coordination, adaptability, and other teamwork attributes are desirable for any team context, regardless of task or job. Accordingly, teamwork knowledge is considered to generalize across tasks and jobs, so long as they are performed in a team context (Stevens & Campion, 1994, 1999). This generalizability across teams, tasks, and potentially organizations makes teamwork knowledge assessments appealing in that they may offer great utility to organizations. Teamwork knowledge assessment focuses on those constructs previously mentioned (see Salas et al., 2009 for a comprehensive list of teamwork competencies). And similar to individual knowledge assessment, the method by which teamwork is assessed differs depending on whether the knowledge is declarative or procedural in nature. Multiple-choice, short-answer, and essay examinations are often used to assess teamwork declarative knowledge, whereas simulations, work samples, SJTs, and interviews are used to assess teamwork procedural knowledge. Notably, there is a dearth of research on the development of reliable and valid assessments of teamwork knowledge that is generalizable across teams, jobs, and organizations.

In summary, consideration of job knowledge in the team context highlights many parallels with the individual context as well as unique features. In interdependent teams, where each member has a specific role, knowledge specialization on the individual level will be of paramount importance and the coordination of each person's specialized role is what is unique to the team. In the contextual domain, the concept of teamwork knowledge is somewhat unique. This is knowledge about cohesion, coordination, communication, cooperation, adaptability, and backup/supporting that

is relevant in the team setting. Like interpersonal knowledge as assessed by SJTs as described above, this knowledge is generalizable across teams, jobs, and organizations, although research on the measurement of this knowledge is just beginning to gain traction. Also unique to teams is consideration of knowledge about the unique skills and abilities (both task- and team-related) of other team members. This is also a relatively new area of research that points to the idea that meta-knowledge is important; that is, it is not just individual knowledge that matters; but knowing what your colleagues know will also importantly contribute to organizational outcomes.

FUTURE DIRECTIONS

Job knowledge has traditionally been recognized as an important direct determinant of job performance, but consideration of this construct has traditionally been limited to a narrow definition of task-specific knowledge relevant for a particular job. Moreover, a common assumption is that assessment of this task-specific knowledge would not be useful in the selection context. Above, we provide a broad definition of job knowledge and highlight the ways in which modern selection methods capture different types of job knowledge. The review above suggests that research on job knowledge is indeed thriving. Below we offer further ideas for research and practice related to job knowledge. In particular, we encourage thinking about the different types of job knowledge assessed by method-driven predictors, further development of job knowledge measures that are generalizable across jobs and organizations, more research on the relationship between job knowledge/expertise and adaptability, a broader assessment of group differences in job knowledge, and a global perspective on research on job knowledge. Each is described in more detail below.

Linking Job Knowledge to Method-Driven Predictors

There has been a focus on method over construct for an array of effective predictors currently in use for selection (e.g., Schmidt & Hunter, 1998; see Arthur & Villado, 2008). As such, the constructs that underlie the success of these predictors are not well understood. This is beginning to change

somewhat as researchers examine the construct validity of many popular selection methods including the development of a taxonomy of constructs examined in job interviews and a focus on the constructs assessed with SJTs (Huffcutt et al., 2001; Motowidlo & Beier, 2010). One problem with many of these efforts, however, is that the definition of job knowledge has been somewhat lacking – and definitions that have been offered have been relatively narrow (Schmidt & Hunter, 1998). Our first suggestion for future study is research linking method-driven predictors to constructs. We posit that the success of many of the useful predictors used in selection (e.g., assessment centers, SJTs, work samples) will be linked to some aspect of job knowledge. We offer the taxonomy of job knowledge in Figure 10.1 as a framework for this research.

As part of the effort to link constructs to measures, it will be important to further investigate how job knowledge constructs are interrelated or redundant. For instance, Motowidlo and Beier (2010) have described the construct measured by most SJTs as interpersonal procedural knowledge. It is unclear if and how this construct differs from tacit knowledge and facets of emotional intelligence. Although some research has begun understanding the nomological network of constructs associated with job knowledge (Lievens & Chan, 2010), there remain many opportunities to tie together these seemingly disparate areas of inquiry.

Development of Job Knowledge Measures

A second opportunity for research and practice is related to the development of job knowledge measures that span organizations and jobs. This recommendation has extensive practical implications as selection professionals voice their desire for valid and reliable job knowledge measures (Ryan & Ployhart, 2014). Contrary to the idea that job knowledge measures must be narrowly defined in the job-specific task domain, and can only be used with people who have prior job experience, researchers are beginning to identify methods for assessing general knowledge related to both interpersonal and task domains that may prove useful for predicting performance across an array of occupations (e.g., tacit knowledge, interpersonal procedural knowledge as measured by SJTs; Motowidlo & Beier, 2010; Sternberg, 1999). These types of measures would also be useful for predicting teamwork performance in team contexts. The extent to

which these types of general knowledge measures account for incremental variance over and above measures of cognitive ability in actual selection contexts should prove to be a useful area of future research.

Knowledge, Expertise, and Adaptability

Above, we have mainly discussed the benefits of greater job knowledge for job performance. There may be instances, however, when increased knowledge and expertise may be detrimental to performance such as when people are asked to change well-learned routines or adapt to changes in the performance environment. For instance, experimental researchers have examined how overlearning may cause functional fixedness and decreased flexibility in problem solving (Crossley, Ashby, & Maddox, 2014). It is unclear how this research conducted in experimental settings translates to work contexts, but it is indeed likely that adaptive performance will be affected by prior knowledge and expertise. Theory suggests that expertise may make people more adaptive in that they can see more routes to a desired outcome (Smith, Ford, & Kozlowski, 1997), and some work on adaptability and adaptive performance has begun (Ployhart & Bliese, 2006), but future work is needed to understand the relationship between knowledge, expertise, and adaptability.

Broader Consideration of Job Knowledge Across Populations

Our next practice and research recommendation is related to expanding the samples examined in job knowledge research – pertaining to both samples examining group differences related to adverse impact in the US, and global samples. As stated earlier, research in the US on adverse impact related to job knowledge measures has focused mainly on Black–White differences. Needless to say, this work does not capture the diversity of the US workforce and does not address global issues in selection. In particular, the relevance of adverse impact is somewhat limited to US markets. There are also theoretical reasons to expect that individual differences – other than race – are important influences on job knowledge. In particular, age has been shown to be positively related to knowledge across most

domains, although the abilities related to memory and reasoning ability may decline with age (Horn & Cattell, 1966). As such, age may be an interesting moderator of the knowledge–performance relationship in work contexts, which deserves increased research attention. Research on age and job-related knowledge may have particular relevance globally as many industrial countries have mandatory retirement ages that may limit the contributions that highly knowledgeable mature workers can make.

There may be little reason to believe that the research on job knowledge – especially related to its prediction of job performance – would differ cross-culturally. Nonetheless, questions related to the use and acceptance of such measures globally will be important to consider. Furthermore, interpersonal procedural knowledge (Motowidlo & Beier, 2010) – or knowledge about appropriate trait expression – will differ across cultures. This knowledge about how to operate effectively across different cultural environments will become increasingly important as organizations operate within a global marketplace. Job knowledge measures, such as simulations and SJTs, will continue to be important tools for identifying those who have the interpersonal skills to operate successfully across a range of cultural environments.

CONCLUSION

Job knowledge has always been considered an important direct determinant of job performance. Indeed, it is one of the only direct determinants of performance (Campbell et al., 1996; Hunter, 1983, 1986). Nonetheless, job knowledge research and assessment historically has not been considered to be at the forefront of innovation in I/O. Ideas about job knowledge are changing, however, as the field begins to recognize that many effective measures used in personnel selection assess job knowledge to some extent. As we have described above, job knowledge is an extremely broad construct: it can be general and applicable across jobs or specific to the special circumstances and tasks required by a particular job. In this chapter, we provide a taxonomy of job knowledge that we hope will be useful for understanding the dimensionality of job knowledge and for further describing the types of knowledge assessed in the context of selection. In particular, assessments of job knowledge can represent knowledge related to task and contextual performance across declarative and procedural types. We have also presented

a theoretical framework for understanding how job knowledge can develop through myriad experiences – some related to work and some not – that are a function of a person's interests, abilities, and personality traits. In conclusion, research on job knowledge is thriving, leading to a better understanding of the determinants of different types of job performance and to better predictors for use in selection.

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Political Skill

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INTRODUCTION

For more than a quarter-century, political perspectives of organizations have been prevalent and influential in organizational theory and research (e.g., Mintzberg, 1983; Pfeffer, 1981, 2010). Fundamental to this view about organizations is that reality often is enacted and socially constructed between individuals. As such, political activities of employees play an important role in shaping others' perceptions and assessments of their individual characteristics, performance, and potential. In turn, these perceptions influence the degree to which individuals are successful within the workplace, as indicated by their ability to obtain organizational resources and rewards, such as increased compensation, more frequent raises, and vertical promotions (Ferris & Hochwarter, 2011; Ferris & Treadway, 2012; Vigoda-Gadot & Drory, 2006).

Concomitant with the realization that organizations are political arenas (Mintzberg, 1983), individuals' careers can be characterized as political campaigns, involving self-promotion, impression management, and the use of influence tactics as well as the development of influential relationships, valuable resource reservoirs, and positive reputational capital (Baruch & Bozionelos, 2011).

Undoubtedly, the success of such campaigns and ultimately, effective career management, depends critically on individual competencies (beyond mere task performance) that enable individuals to effectively manage, package, and subsequently project positive images across different work environments, especially those that influence the assessment of performance and career potential (Greenhaus & Callanan, 2013). To this end, political skill has received much attention in the last decade largely as a function of its demonstrated positive influence not only on those in its possession but also to employing organizations and peripheral others with whom a politically skilled individual works.

POLITICAL SKILL – OVERVIEW OF THE CONSTRUCT

Political skill is formally defined as, 'the ability to effectively understand others at work, and to use such knowledge to influence others to act in ways that enhance one's personal and/or organizational objectives' (Ferris, Treadway, Kolodinsky, Hochwarter, Kacmar, Douglas, & Frink, 2005, p. 127).

Comprised of four related, yet distinct, dimensions (i.e., social astuteness, interpersonal influence, apparent sincerity, networking ability) political skill is considered a comprehensive *set of social competencies* with affective (i.e., understanding; apparent sincerity), cognitive (i.e., knowledge; social astuteness), and behavioral (i.e., influence; interpersonal influence, networking ability) manifestations (Ferris, Treadway, Perrewé, Brouer, Douglas, & Lux, 2007). More specifically, politically skilled individuals are socially astute in that they are able to accurately perceive, comprehend, and interpret their behavior, social interactions, and the behavior of others. As such, *social astuteness* represents the more cognitive aspects of political skill which are necessary to achieve knowledge of others' motivations and desires, whereas *apparent sincerity* reflects a more affective component of political skill. Specifically, apparently sincere individuals conduct themselves in such a way that they are perceived by others as genuine, trustworthy, well-intentioned, and devoid of ulterior motives.

Further, *interpersonal influence* and *networking ability* reflect the behavioral components of political skill required to influence others in attempts to ultimately enhance one's personal and/or organizational objectives. Based on their ability to keenly perceive and understand the social environment, politically skilled individuals demonstrate their interpersonal influence by adapting their behavior to what is situationally appropriate and superiorly effective in eliciting desired attitudinal and behavioral responses from others. In addition, politically skilled individuals are imbued with an uncanny ability to establish and maintain meaningful relationships with influential others at work, bridge connections between individuals and groups, build powerful coalitions, and assuage conflict with ease.

Finally, although the name 'political skill' may seem to imply that this set of social competencies is specific or unique to governmental politics, political skill has been entirely explored in an organizational context. Political skill has been established as a comprehensive set of social competencies (Ferris et al., 2007). Therefore, it is likely that those politicians in possession of political skill would be undoubtedly advantaged; however, political skill has yet to be explored in this context. Thus, throughout this chapter, we discuss political skill entirely within the organizational context, as this is where the entire breadth of scientific inquiries concerning political skill has been conducted. Within the organizational context, politically skilled employees utilize their political savvy to obtain desirable workplace and career outcomes for themselves and others. In

what follows, political skill is discussed in great detail with regard to its measurement, predictors, outcomes, mechanisms through which it operates, specific organizational contexts in which political skill has been examined (e.g., leadership, personal initiative), and directions for future research.

MEASUREMENT

Since its introduction to the organizational sciences literature by Ferris and colleagues, political skill has been formally defined (Ferris et al., 2005), operationalized (Ferris et al., 2005), theoretically grounded (Ferris et al., 2007), conceptually delineated (Ferris et al., 2005, 2007), and empirically established (Semadar, Robins, & Ferris, 2006) as a unique social effectiveness construct. With regard to operationalization, there exist four measures of the political skill construct to date. Information regarding each of the measures (i.e., including the source of the measure, number and list of items, dimensionality, and citations providing evidence of construct validity) can be found in Table 11.1.

Two of the original unidimensional measures reflect fledgling efforts to operationalize and subsequently further explicate political skill's construct domain. These efforts were widely successful as they sparked awareness and interest from the scientific community and inspired more in-depth construct delineation and measure development. Most notably, encouraged by early empirical evidence of the construct's predictive validity, Ferris and colleagues (2005) developed the four-dimensional, 18-item *Political Skill Inventory (PSI)*, which remains the most comprehensive and psychometrically sound measure of the construct to date. The *PSI* has undergone rigorous tests of construct validity (Ferris et al., 2005; Ferris, Bickel, et al., 2008), with empirical evidence indicating that political skill is related to, but unique from, personality and social effectiveness constructs such as conscientiousness, political savvy, self-monitoring, and emotional intelligence (Ferris et al., 2005). Recent meta-analytic evidence confirms these findings (Munyon, Summers, Thompson, & Ferris, 2015). Further, researchers (Ferris et al., 2008) have established political skill as a higher-order factor (i.e., through second-order factor analysis) comprised of its four dimensions (i.e., social astuteness, interpersonal influence, apparent sincerity, networking ability), which allows researchers the freedom to operate at either the dimensional level or at the aggregate composite level.

Table 11.1 Summary of measures used to operationalize political skill

<i>Citation</i>	<i># of items</i>	<i>Dimensions</i>	<i>Dimension name</i>	<i>Items</i>	<i>Validation evidence</i>
Ferris et al. (1999)	6	1	Understanding of Others ¹	– I find it easy to envision myself in the position of others. – I understand people well.	Ahearn et al. (2004) Perrewé et al. (2004) Perrewé et al. (2005)
			Interpersonal Influence	– I am able to make most people feel comfortable and at ease around me. – It is easy for me to develop good rapport with most people. – I am good at getting others to respond positively to me. – I usually try to find common ground with others.	Harris et al. (2007) Shi et al. (2013)
Ferris et al. (2001)	7	1	n/a	– I find it easy to put myself in the position of others. – I am keenly aware of how I am perceived by others. – In social situations, it is always clear to me exactly what to say and do. – I am particularly good at sensing the motivations and hidden agendas of others. – I am good at making myself visible with influential people in my organization. – I am good at reading others' body language. – I am good to adjust my behavior and become the type of person dictated by any situation.	Witt & Ferris (2003) Hochwarter et al. (2006)
Ferris et al. (2005)	18	4	Networking Ability	– I spend a lot of time and effort at work networking with others. – I am good at building relationships with influential people at work. – I have developed a large network of colleagues and associates at work whom I can call on for support when I really need to get things done. – At work, I know a lot of important people and am well connected. – I spend a lot of time at work developing connections with others. – I am good at using my connections and network to make things happen at work.	Ferris et al. (2005) Treadway et al. (2005) Ferris, Bickie et al. (2008) Lvina et al. (2012)
			Apparent Sincerity	– When communicating with others, I try to be genuine in what I say and do. – It is important that people believe I am sincere in what I say and do. – I try to show a genuine interest in other people.	
			Social Astuteness	– I understand people very well. – I am particularly good at sensing the motivations and hidden agendas of others. – I have good intuition or savvy about how to present myself to others. – I always seem to instinctively know the right things to say or do to influence others. – I pay close attention to people's facial expressions.	

(Continued)

Table 11.1 Summary of measures used to operationalize political skill (continued)

<i>Citation</i>	<i># of items</i>	<i>Dimensions</i>	<i>Dimension name</i>	<i>Items</i>	<i>Validation evidence</i>
Snell et al. (2014)	17	5	Interpersonal Influence	– I am able to make most people feel comfortable and at ease around me.	Snell et al. (2014)
				– I am able to communicate easily and effectively with others.	
				– It is easy for me to develop good rapport with most people.	
				– I am good at getting people to like me.	
			Networking Ability	– I spend a lot of time and effort at work networking with others.	
				– At work, I know a lot of important people and am well connected.	
				– I am good at using my connections and network to make things happen at work.	
				– I have developed a large network of colleagues and associates at work whom I can call on for support when I really need to get things done.	
			Apparent Sincerity	– I spend a lot of time at work developing connections with others.	
				– I am good at building relationships with influential people at work.	
				– It is important that people believe I am sincere in what I say and do.	
		Image Management		– When communicating with others, I try to be genuine in what I say and do.	
				– I always seem to instinctively know the right things to say or do to influence others.	
				– I have good intuition or savvy about how to present myself to others.	
		Social Astuteness		– I am particularly good at sensing the motivations and hidden agendas of others.	
				– I pay close attention to people's facial expressions.	
		Interpersonal Influence		– I understand people very well.	
				– It is easy for me to develop good rapport with most people.	
				– I am able to make most people feel comfortable and at ease around me.	
				– I am able to communicate easily and effectively with others.	
				– I am good at getting people to like me.	

¹ While Ferris, Berkson, Kaplan, Gilmore, Buckley, Hochwarter, & Witt (1999) expected scale items to load onto two distinct factors (i.e., understanding of others, interpersonal influence), empirical evidence revealed that the items reflected a unidimensional scale.

Finally, the *PSI* has demonstrated cross-cultural equivalence across five different cultures (Lvina et al., 2012). More specifically, Lvina and colleagues (2012) found political skill (i.e., as operationalized by the 18-item *PSI*) to be stable across American, Chinese, German, Russian, and Turkish respondents. Further, the item loadings and intercepts were for the most part invariant across the samples. However, when loadings or intercepts did not demonstrate invariance, they tended to vary as a function of known cultural differences, namely, uncertainty avoidance and low- versus high-context communication. Specifically, whereas political skill levels were slightly constrained in cultures characterized by high uncertainty avoidance (e.g., Germany), respondents from cultures characterized by an indirect communication style (e.g., China, Turkey) demonstrated higher levels of social astuteness and networking ability (Lvina et al., 2012).

ANTECEDENTS OF POLITICAL SKILL

In comparison to the numerous studies examining the effects of political skill on oneself and others, relatively few studies have examined the development of political skill and its dimensions. Nonetheless, political skill is believed to have both dispositional and developmental antecedents (Ferris et al., 2007). In regard to the former, as can be seen in Table 11.2, a handful of studies have

examined the four themes identified by Ferris and colleagues (2007) as antecedents of political skill. Specifically, Ferris et al. (2007) examined control, perceptiveness, affability, and active influence as categories of dispositional antecedents that best captured elements of individuals' personalities that positioned or predisposed them to demonstrate situationally appropriate behavior and personal influence.

The control dispositional theme suggests that political skill and its dimensions develop partly as a function of the extent to which individuals perceive personal and/or environmental control (Ferris et al., 2007). Individuals who are internally focused and self-efficacious, for example, are argued to demonstrate greater interpersonal influence and networking abilities largely as a function of their self-confidence, mastery of the environment, and their positive beliefs in self. In support, Ferris et al. (2008) found self-efficacy to be positively related to both composite political skill and interpersonal influence (but not networking ability).

The perceptiveness theme encompasses dispositional constructs (e.g., self-monitoring, conscientiousness) that reflect a superior ability to observe and regulate one's behavior. Given the inherent observational and behavioral adaptability components, perceptiveness has been argued to influence the development of social astuteness (Ferris et al., 2007). In support, research has found that both self-monitoring and conscientiousness were positively related to social astuteness (Ferris et al., 2005).

Table 11.2 Summary of research examining the personality and ability antecedents of political skill

<i>Personality antecedent category</i>	<i>Personality and ability correlate</i>	<i>Correlated with:</i>	<i>Citation</i>
Control	Self-efficacy	Composite Political Skill	Ferris et al. (2008)
		Interpersonal Influence	Ferris et al. (2008)
Perceptiveness	Self-monitoring	Social Astuteness	Ferris et al. (2005)
	Conscientiousness	Social Astuteness	Ferris et al. (2005)
	Emotion Recognition Ability	Composite Political Skill	Momm et al. (2015)
Affability	Positive Affectivity	Composite Political Skill	Kolodinsky et al. (2004)
		Composite Political Skill	Kolodinsky et al. (2004)
	Extraversion	Interpersonal Influence	Ferris et al. (2008); Liu et al. (2007)
		Social Astuteness	Ferris et al. (2008); Liu et al. (2007)
		Networking Ability	Ferris et al. (2008); Liu et al. (2007)
	Humility	Composite Political Skill	Smith et al. (2009)
	Affability	Composite Political Skill	Smith et al. (2009)
Active Influence	Proactive Personality	Composite Political Skill	Liu et al. (2007)
		Networking Ability	Thompson (2005)
	Self-motivation	Composite Political Skill	Smith et al. (2009)

Captured by personality traits like agreeableness, extraversion, and positive affectivity, the affability dispositional theme refers to a likeable, pleasant, and outgoing orientation (Ferris et al., 2007). As initially hypothesized (Ferris et al., 2007), research has found positive affectivity and extraversion to be positively related to composite political skill (Kolodinsky, Hochwarter, & Ferris, 2004), and extraversion to be positively related to the interpersonal influence, social astuteness, and networking ability dimensions of political skill (Ferris et al., 2008; Liu, Ferris, Zinko, Perrewé, Weitz, & Xu, 2007). In support, recent qualitative research identified two traits encompassed under the affability dispositional theme; that is, humility (i.e., 'being one with others') and affability (i.e., ease in interacting with others, friendly, outgoing), as dispositional antecedents of political skill (Smith, Plowman, Duchon, & Quinn, 2009).

The perceptiveness dispositional theme of political skill has been most recently examined through the lens of emotional intelligence. Meisler (2014) argued that as a form of intelligence (Mayer, Caruso, & Salovey, 1999), emotional intelligence, or 'the ability to perceive accurately, appraise, and express emotions; the ability to understand emotions and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth' (Mayer & Salovey, 1997, p. 10), would be positively related to individuals' political skill. In this manner, Meisler (2014) argued that emotional intelligence would provide the essential emotional understanding that politically skilled individuals needed to effectively influence others. Results provided support for this hypothesis; moreover, political skill was found to mediate the emotional intelligence–job satisfaction relationship.

Similarly, given the increasingly interconnected nature of today's work (Ferris, Liden, Munyon, Summers, Basik, & Buckley, 2009), Momm and colleagues (Momm, Blickle, Liu, Wihler, Kholin, & Menges, 2015) examined an element of emotional intelligence, emotion recognition ability (ERA), as a predictor of political skill, and ultimately, individuals' annual income. Results indicated that the positive effects of emotion recognition ability (i.e., the ability to 'recognize the meanings of emotions and their relationships, and to reason and problem-solve on the basis of them'; Mayer et al., 1999: p. 267) on annual income were mediated by political skill. Thus, support was found for Momm et al.'s (2015) assertion that the emotional perceptivity afforded by ERA assists in individuals' careful development and successful deployment of political skill. Taken together, these most recent studies seem to suggest that emotional abilities (i.e., those reflecting the perceptive

dispositional theme) exert their influence on job outcomes through their more proximal effect on political skill.

Next, the active influence theme captures dispositional constructs that are comprised of a strong action-orientation (e.g., proactive personality). Individuals with an active influence orientation are action-oriented and goal-directed, and take proactive actions to influence their environments. As such, active influence dispositional themes have been hypothesized to engender heightened interpersonal influence and networking ability. In support, research has found a positive association between proactive personality and composite political skill (Liu et al., 2007), as well as between proactive personality and network building (Thompson, 2005). In further support of the association between active influence and political skill, Smith et al. (2009) identified self-motivation (i.e., internal motivation, desire to succeed, personal drive) as a dispositional antecedent of plant managers' political skill.

Finally, although political skill is considered to be partially innate and partially learnable, even fewer studies to date have examined the developmental antecedents of political skill. Conceptually, researchers (Ferris et al., 2007) have argued that individuals can develop political skill through their interactions with skilled mentors as well as through behavioral role modeling. In support, Blass et al. (Blass, Brouer, Perrewé, & Ferris, 2007) found that mentoring behaviors positively affected individuals' networking abilities, and this relationship was mediated by individuals' understanding of politics. Nonetheless, there exist numerous opportunities to explore the developmental antecedents of political skill in greater detail.

POLITICAL SKILL AS A PREDICTOR OF PERFORMANCE

To date, political skill enthusiasts arguably have been most interested in whether and how individuals in possession of political skill are advantaged from a performance standpoint (Munyon et al., 2015). This is not surprising given that job performance is undoubtedly the *raison d'être* and the ultimate criterion of interest for organizational scientists (Organ & Paine, 1999) and politically skilled individuals alike. A growing body of literature has established political skill's demonstrated impact on multiple types of performance through various mediating mechanisms and as constrained by various boundary conditions; Figure 11.1 is used to organize the following discussion.

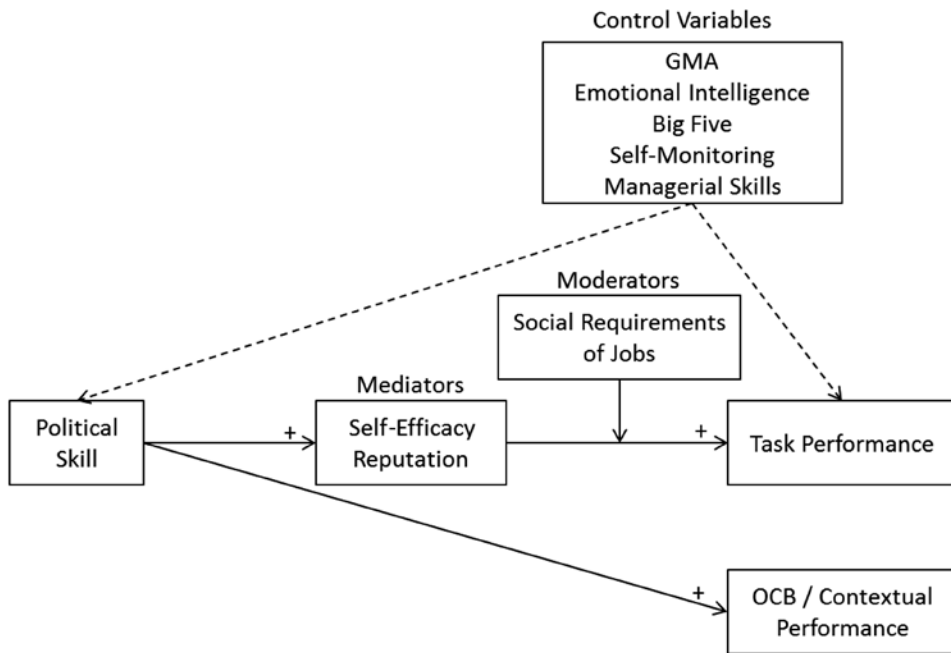


Figure 11.1 Synthesis of research linking political skill to performance

Research suggests that politically skilled individuals demonstrate heightened performance in comparison to their non-politically skilled peers, even after controlling for numerous relevant personality and social effectiveness constructs. Specifically, in establishing the predictive validity of the 18-item *PSI*, Ferris and colleagues (2005) found that political skill was positively related to annual internal performance ratings. Further, research has found political skill to be the strongest predictor of individuals' performance among emotional intelligence, self-efficacy, and self-monitoring; moreover, political skill explained significant incremental variance in performance ratings above and beyond the aforementioned social effectiveness constructs (Semadar et al., 2006).

Similarly, evidence from both cross-sectional and longitudinal research suggests that political skill explained significant variance in job performance above and beyond both general mental ability (GMA) and the 'Big Five' personality variables (i.e., conscientiousness, extraversion, neuroticism, openness, and agreeableness (Blickle, Kramer et al., 2011). Recent meta-analytic research confirmed these findings, as meta-regression analyses indicated that political skill predicted task performance above and beyond GMA and personality (Bing, Davison, Minor, Novicevic, & Frink, 2011; Munyon et al., 2015).

Taken together, both single-study and meta-analytic results provide strong support for the importance of political skill in the prediction of task performance. Moreover, political skill also has been shown to predict contextual performance. Specifically, research has found that political skill was a stronger predictor of organization- and individual-directed organizational citizenship behaviors than was self-efficacy (Jawahar, Meurs, Ferris, & Hochwarter, 2008). Further, Blickle, Kramer, and colleagues (2011) found that political skill significantly predicted interpersonal facilitation (i.e., the extent to which employees are perceived as considerate, cooperative, and helpful; Van Scotter & Motowidlo, 1996) even after controlling for GMA and the Big Five personality constructs. Moreover, meta-analytic research confirms this positive association between political skill and various types of contextual performance (Bing et al., 2011; Munyon et al., 2015).

Nonetheless, results of Munyon and colleagues' (2015) meta-analysis revealed that the bivariate association of political skill with task performance ($\rho = .26$, $CI_{95\%} = .18 < .22 < .26$) and contextual performance ($\rho = .38$, $CI_{95\%} = .24 < .33 < .42$) while significant, varied widely as a function of intervening variables (task performance: $CV_{95\%} = [-.07, .52]$; $Q = 204.33$, $p < .01$; contextual performance: $CV_{95\%} = [-.05, .71]$; $Q = 169.72$, $p < .01$).

To this end, a handful of studies have examined a number of job characteristics capable of strengthening the positive association between political skill and performance. For instance, research has found political skill to be increasingly related to both task and contextual performance the more that a job required social and interpersonal interaction (Bing et al., 2011; Blickle, John et al., 2012; Blickle, Kramer et al., 2009).

In addition to examinations of the main effects and boundary conditions of political skill on task and contextual performance domains, researchers have begun to examine the mechanisms through which individuals' political skill influences performance criteria. In this regard, Liu and colleagues (2007) argued and found support for the mediating role of reputation on the political skill–job performance relationship. Specifically, it was argued that politically skilled individuals would elicit favorable reputations as they conduct themselves in ways that inspire others' trust and confidence and engage in behaviors that are influential, situationally appropriate and apparently sincere. In turn, reputation was argued to influence performance evaluations as reputation both provides the backdrop against which behaviors are perceived and interpreted and also serves to influence others' evaluations (Liu et al., 2007). Results provided full support for these assertions. Moreover, meta-regression analyses found that both self-efficacy and reputation served to mediate the relationship between political skill and performance (Munyon et al., 2015), suggesting that the effects of political skill on performance can be explained in part through others' assessments of one's social capital (i.e., reputation), as well as one's own assessments of social capital (i.e., self-efficacy).

Finally, recent research suggests that personal initiative may also serve as a mechanism through which political skill operates. Specifically, personal initiative is an active work concept grounded in human agency (Bandura, 2006) that describes a collection of proactive, action-oriented, and goal-directed behaviors (Frese, Kring, Soose, & Zempel, 1996). Wihler and colleagues (Wihler, Blickle, Ellen III, Hochwarter, & Ferris, 2017) suggested that when the work climate is conducive to doing so, individuals will demonstrate proactive, achievement-oriented behaviors, and ultimately, heightened performance. In this manner, the work climate provides individuals with expectancy information regarding the extent to which proactive behaviors will be instrumental in achieving desirable performance outcomes. Moreover, Wihler et al. argued that as a function of their social astuteness, politically skilled individuals would be more likely to appropriately determine if the work context supported proactive,

personal initiative efforts; additionally, as a function of their interpersonal influence, politically skilled individuals were argued to be superiorly effective at leveraging their proactive initiatives to achieve desirable goals (e.g., performance). Results across three studies provided overwhelming support for these arguments; specifically, individuals demonstrated heightened performance as the combinative effects of social astuteness and interpersonal influence ostensibly allowed them to appropriately read situations and properly mobilize personal initiative efforts (Wihler et al., 2017).

POLITICAL SKILL AS MODERATOR OF THE EMPLOYEE CHARACTERISTICS–JOB PERFORMANCE RELATIONSHIP

Researchers have also engaged in research efforts to examine how political skill serves to strengthen the positive relationships between many established employee trait/characteristic–performance relationships. For instance, meta-analytic research has demonstrated that conscientiousness is a consistently strong predictor of performance across all occupations (e.g., Barrick, Mount, & Judge, 2001). Nonetheless, Witt and Ferris (2003) argued that conscientious individuals (i.e., those who are disciplined, determined, and accomplishment-driven, Costa & McCrae, 1992), would be seen as overly demanding or inflexible, and as a result, receive sub-par performance evaluations when they lacked the perceptivity of, and ability to influence, social situations.

Results provided support for this hypothesis; specifically, individuals demonstrated the most auspicious levels of performance when they were both high in conscientiousness and (social) political skill (Witt & Ferris, 2003). Contrarily, in three of the four studies, individuals demonstrated the most inauspicious levels of performance when they were highly conscientious but lacking (social) political skill. Moreover, early research (i.e., predating the establishment of the 18-item *PSI* measure) found that individuals with both high levels of (social) political skill and GMA demonstrated the best performance and received the highest salaries in comparison to their peers who were either low in (social) political skill and/or GMA (Ferris, Witt, & Hochwarter, 2001).

Further, a number of studies also have examined political skill in the context of socioanalytic theory. Socioanalytic theory suggests that underpinning all social interactions are individuals' two basic desires to get along (i.e., to feel supported, accepted, and not isolated) and get ahead (i.e., to gain power,

status, and the control of resources) (Hogan, 1983, 1991, 1996). Nonetheless, individual differences (e.g., social skill) affect the extent to which individuals actually accomplish these desired motives. Across numerous studies, political skill was found to 'ignite' (Hogan & Shelton, 1998) or properly translate individuals' motives to get ahead and/or get along into heightened performance.

For example, Blickle and colleagues (Blickle, Meurs, Zettler, Solga, Noethen, Kramer, & Ferris, 2008) examined the moderating role of political skill on the conscientiousness–performance and agreeableness–performance relationships. The authors argued that only those individuals with the proper social competencies (i.e., political skill) would be able to translate their motive to get ahead (i.e., conscientiousness¹) and motive to get along (i.e., agreeableness) into heightened performance. Their results provided some support for the interactive effect of conscientiousness and political skill (after correcting for range restriction in conscientiousness) and found full support for the interactive effect of agreeableness and political skill on job performance.

Similarly, Blickle et al. (Blickle, Fröhlich, Ehler, Pirner, Dietl, Hanes, & Ferris, 2011) found that the motive to get along $\times$ political skill interaction and the motive to get ahead $\times$ political skill interaction predicted the most auspicious levels of supervisor-rated cooperation and supervisor-rated promotability assessments than any other combinations of motive and social competence. Additionally, research has found that car salespersons demonstrating high levels of extraversion (i.e., motive to get ahead) and political skill sold more cars than salespersons with any other combination of extraversion and political skill (Blickle, Wendel, & Ferris, 2010). Finally, employing a narrow trait perspective, Meurs and colleagues (Meurs, Perrewé, & Ferris, 2011) examined a dimension of political skill, networking ability, as a social competence capable of translating individuals' trait sincerity into task performance. The results indicated that high trait sincerity (i.e., motive to get along) interacted with networking ability (i.e., social competence) to predict the most auspicious levels of task performance.

POLITICAL SKILL AS MODERATOR OF THE IMPRESSION MANAGEMENT–JOB PERFORMANCE RELATIONSHIP

Not surprisingly, individuals who are able to inspire trust in others, appear devoid of ulterior motives, and engage in influential situationally

appropriate behaviors are better able to engage in effective impression management behavior. To this end, empirical evidence suggests that the impression management behaviors of politically skilled individuals are more successful than those of their non-politically skilled peers. For instance, Treadway and colleagues (Treadway, Ferris, Duke, Adams, & Thatcher, 2007) found that supervisors were less likely to perceive their subordinates' ingratiatory tactics as manipulative influence behavior when the perpetrating subordinates were high in political skill. In turn, the less supervisors perceived their subordinates to be engaged in ingratiatory tactics, the higher they rated their subordinates on interpersonal facilitation (i.e., cooperative, considerate, helpful).

In other words, politically skilled individuals were better able to disguise their supervisor-directed ingratiation which resulted in supervisors rating them as more interpersonally effective (Treadway et al., 2007). Similarly, politically skilled individuals who utilized self-promotion, supplication, ingratiation, exemplification, or intimidation tactics received the most auspicious performance ratings from their supervisors as compared to non-politically skilled individuals who engaged in these impression management tactics (Harris, Kacmar, Zivnuska, & Shaw, 2007).

Further, Kolodinsky and colleagues (Kolodinsky, Treadway, & Ferris, 2007) argued that politically skilled individuals would both be more likely to engage in, and effective at, rational persuasion. In turn, the authors argued that the effective use of rationality would positively influence supervisors' perceptions of similarity with and liking for their subordinate, and ultimately positively influence the supervisors' ratings of subordinates' task and contextual performance. Results provided strong support for these hypotheses. Moreover, as a function of their subtle, yet convincing interpersonal style, politically skilled individuals have been argued to appropriately represent their past achievements to others in ways that are non-threatening (Ferris et al., 2007). In support, recent empirical research found that politically skilled individuals were more effective at leveraging their past performance into further acquisitions of interpersonal power; in contrast, non-politically skilled individuals did not achieve additional interpersonal power as a function of past performance exploits (Treadway, Breland, Williams, Cho, Yang, & Ferris, 2013).

Finally, research has found that the effects of politically skilled individuals' impression management techniques pay dividends for years to come. Specifically, Blickle et al. (Blickle, Diekmann, Schneider, Kalthöfer, & Summers, 2012) found that politically skilled individuals who utilized modesty (i.e., humility) as a form of impression management

(e.g., refraining from self-praise, refusing to toot their own horn) reported the highest levels of career satisfaction and hierarchical rank after three years. Contrarily, non-politically skilled individuals who engaged in modesty as a means of impression management reported reductions in career satisfaction and lower hierarchical ranks three years later. Taken together, this collection of studies illustrates the importance of political skill as a convincing interpersonal style construct that enables individuals to comprehend situational cues, select situation-specific and situation-appropriate behaviors, and execute influence attempts in a superiorly effective and genuine manner.

POLITICAL SKILL AND CAREER SUCCESS

Given that meta-analytic research has linked general political knowledge and skills to career success (Ng, Eby, Sorenson, & Feldman, 2005), it is not surprising that the benefits of individuals' political skill extend far beyond mere task or contextual performance to include long-term objective and subjective career success. In this regard, evidence suggests that political skill is positively related to perceived external mobility, career and life satisfaction, and total number of promotions received (Todd, Harris, Harris, & Wheeler, 2009). Moreover, Todd and colleagues (2009) found that the networking ability dimension of political skill was the strongest and most consistent predictor of total compensation as well as the aforementioned career success outcomes.

Similarly, research has indicated that political skill is positively related to supervisors', peers', and direct-reports' assessments of an individual's promotability (Gentry, Gilmore, Shuffler, & Leslie, 2012). Consistent with these single-study findings, recent meta-analytic research found political skill to be positively associated with overall career success, objective career success (i.e., hierarchical position), and subjective career success (i.e., career satisfaction) (Munyon et al., 2015).

Finally, in attempts to identify the manner through which political skill positively influences career success indicators over time, Blickle et al. (Blickle, Schneider, Liu, & Ferris, 2011) examined reputation as a mediating mechanism. Results indicated that political skill in Time 1 predicted income, hierarchical position, and career satisfaction one year later, with reputation mediating the relationship between political skill, career satisfaction, and position. Further, research has indicated that politically skilled subordinates obtain career development opportunities by employing

their interpersonal acumen to generate *guanxi* (i.e., strong informal connections between supervisors and subordinates which represent the most critical of relationships for individuals in Chinese organizations) with their supervisors (Wei, Liu, Chen, & Wu, 2010).

Building on these findings and integrating past research linking political skill to career success outcomes, we propose a multi-mediational moderated model of political skill's effects on long-term career success (see Figure 11.2). We suggest that individuals who are politically skilled will engage in career-oriented networking behaviors as they recognize that opportunities to engage in interpersonal interactions are both advantageous (as opposed to threatening) (Perrewé, Ferris, Frink, & Anthony, 2000) as well as effective at promoting one's own self-interests (Kacmar & Carlson, 1997). Moreover, politically skilled individuals acknowledge the individual and contextual considerations in the work environment, and engage in networking behaviors as a way to capitalize on these informalities.

Further, to the extent that politically skilled individuals have a long-term future time perspective, they are more likely to invest their resources in career-related networking behaviors. In support, Treadway and colleagues (Treadway, Breland, Adams, Duke, & Williams, 2010) found that individuals withdrew or refrained from career-oriented networking behaviors as they perceived their time in the organization to be drawing to a close (e.g., retirement approached, impending career change).

In turn, given their effective interpersonal style and perceived sincerity, politically skilled individuals are thought to recognize, develop, and maintain stockpiles of networking resources (i.e., those resources that are derived from, included within, accessible through individuals' relational connections; Nahapiet & Ghoshal, 1998). Developed through skilled interpersonal interactions, such networking resources contribute to increased interpersonal trust, reputation, and social capital (Gulati, 1999), as well as broader (sometimes privileged) informational access, personal influence, power, and status (Lin, 1999; Wei, Chiang, & Wu, 2012).

In other words, as Figure 11.2 suggests, the networking resources developed through politically skilled individuals' career-oriented networking behaviors engender heightened career success potential (as rated by supervisors, peers, and subordinates; Gentry et al., 2012). Further, in keeping with Wei and colleagues (2012), we posit that individuals should be better able to leverage networking resources into career success potential commensurate with their political skill. In turn, career success potential is hypothesized to positively relate to individuals' personal reputation.

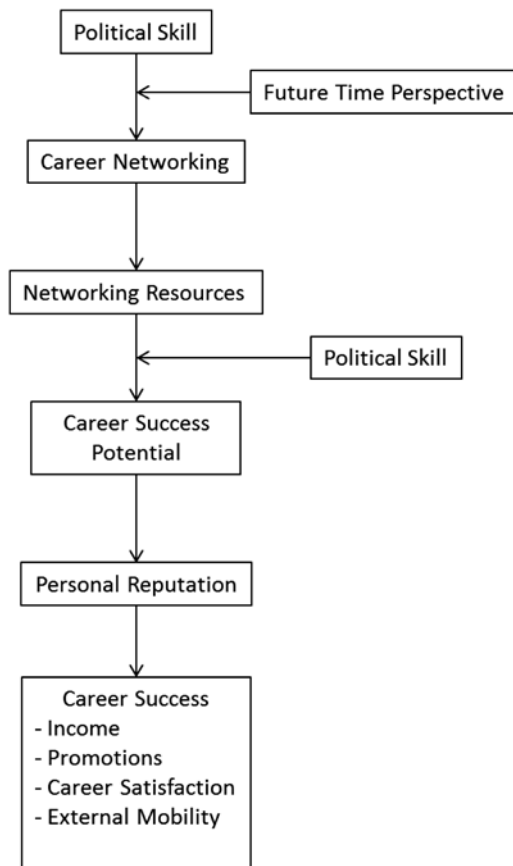


Figure 11.2 Proposed model of the long-term influence of political skill on career success

Reputation forms over time and represents others' judgments and perceptions of the extent to which a focal individual performs adequately, and is interpersonally cooperative/pleasant (Zinko, Ferris, Humphrey, Meyer, & Aime, 2012). Grounded in evidence that has found reputations to form over time as a function of human capital and social effectiveness (Zinko et al., 2012), we posit that career success potentially positively influences others' judgments of a focal individual's personal reputation over time. Finally, in keeping with prior research (Blickle et al., 2011; Liu et al., 2007), we posit that personal reputation contributes to individuals' objective and subjective career success.

Specifically, personal reputation signals or conveys information about a focal individual's capabilities (Spence, 1974) thereby reducing uncertainty surrounding an individual's potential motives (Johnson, Erez, Kiker, & Motowidlo, 2002) and the likelihood (and quality) of their future performance. Taken together, positive

reputation should reduce uncertainty and signal that individuals are worthy of increased compensation, and capable of handling new and challenging opportunities such as vertical promotions.

POLITICAL SKILL AS NEUTRALIZER OF PERCEIVED ORGANIZATIONAL AND SOCIAL STRESSORS

In addition to the performance- and career-enhancement benefits of political skill, individuals in possession of this comprehensive set of social competencies are better equipped to manage the organizational and social stressors with which they are faced on a daily basis. Specifically, researchers have argued that politically skilled individuals experience less strain when faced with various stressors as a function of their increased confidence

and self-control as well as their possession of and abilities to acquire additional coping resources. In support, Perrewé and colleagues (Perrewé, Zellars, Ferris, Rossi, Kacmar, & Ralston, 2004) found that the possession of political skill neutralized the negative effects of perceived role conflict on three types of strain; namely, somatic complaints, physiological strain (i.e., systolic and diastolic blood pressure), and psychological anxiety.

Similarly, Perrewé and colleagues (Perrewé, Zellars et al., 2005) argued that politically skilled individuals would experience less strain (i.e., anxiety, job tension, job dissatisfaction) when faced with role overload as a function of their heightened sense of personal security and ability to exert control over processes and social interactions within their work environments; results provided overwhelming support for their study hypotheses.

Moreover, Rosen and Levy (2013) examined the strain-buffering effects of political skill when individuals were faced with environments that they perceived to be political. Political environments are considered stressful given that they infuse ambiguity and uncertainty into the work environment (Chang, Rosen, & Levy, 2009; Ferris, Adams, Kolodinsky, Hochwarter, & Ammeter, 2002); nonetheless, because politically skilled individuals are able to influence others and extract desirable outcomes from their work environments, Rosen and Levy (2013) argued that politically skilled individuals would experience less strain when faced with political environments than their less politically skilled peers. Results provided support for the strain-attenuating role of political skill on the politics perceptions (POPs)–strain relationship.

Finally, characterizing felt accountability as a stressor due to the concomitant anxiety associated with the increased levels of scrutiny (Lerner & Tetlock, 1999), Hochwarter et al. (Hochwarter, Ferris, Gavin, Perrewé, Hall, & Frink, 2007) argued that politically skilled individuals experience less job tension when faced with heightened levels of felt accountability and in turn receive higher job performance ratings; results provided support for the authors' moderated mediation hypothesis.

In addition to the aforementioned organizational stressors, researchers have also examined the strain-buffering effects of political skill on a number of perceived social stressor–strain relationships. To this end, Harvey and colleagues (Harvey, Harris, Harris, & Wheeler, 2007) examined the moderating effects of political skill on the relationship of perceived social stressors (e.g., conflicts with supervisors, coworkers; negative feedback: Dormann & Zapf, 2004) and two strain reactions; namely, job and career dissatisfaction. Grounded in Conservation of Resources theory (COR; Hobfoll, 1989), Harvey et al. (2007) argued that political skill represented a coping resource

that protected individuals from actual, or threats of, resource losses. As such, politically skilled individuals were hypothesized to interpret social stressors as less threatening to their resources, and therefore were thought to experience less job and career dissatisfaction when faced with such stressors than their less politically skilled peers. Once again, results provided support for the role of political skill as a buffer of the stressor–strain relationship.

Similarly, political skill was examined as a factor capable of attenuating the positive relationship between perceptions of others' entitlement behaviors and job tension (Hochwarter, Summers, Thompson, Perrewé, & Ferris, 2010). Entitled individuals are motivated to seek out, consume, and monopolize more than their fair share of resources (Samuelson & Allison, 1994). Observing others engaged in entitlement behaviors is thought to result in strain, as such behaviors require attentional focus (Fiske & Taylor, 1984), and should such behaviors be successful, pose a threat to individuals' resources. Nonetheless, as a function of their increased personal security and additional resources that they have available to them, politically skilled individuals experienced less job tension when perceiving high amounts of others' entitlement behaviors than their less politically skilled peers. These results were consistent across three diverse samples.

Finally, in attempts to identify ways in which individuals could effectively cope with workplace ostracism, researchers examined the interactive effects of political skill and ingratiation on various forms of psychological distress (i.e., emotional exhaustion, job tension, depressed mood at work) stemming from workplace ostracism (Wu, Yim, Kwan, & Zhang, 2012). The authors found that politically skilled individuals who engaged in ingratiation in response to being isolated at work experienced no increases in psychological distress when faced with heightened ostracism. However, non-politically skilled individuals who used ingratiation tactics to get in the good graces of their ostracizers actually experienced more psychological distress than had they not engaged in ingratiation tactics. Taken together, these findings suggest that politically skilled ingratiation attempts neutralized the negative effects of workplace ostracism whereas non-politically skilled ingratiation attempts worsened the negative effects of workplace ostracism.

POLITICAL SKILL AND LEADERSHIP

The effects of political skill extend far beyond those simply realized by those in its possession. In addition to the profound effect of political skill on

one's own stress and impression management, job performance, and career success, political skill has a demonstrated effect on leadership processes, follower reactions to leader influence, and ultimately, leader effectiveness (*cf.* Ferris, Treadway, Brouer, & Munyon, 2012). With regard to the latter, research has found that followers' perceptions of their leaders' political skill significantly predicted leadership effectiveness (*i.e.*, work-unit performance, leader performance), even after controlling for relevant demographics (*i.e.*, gender, education) and social skills (*i.e.*, leader's self-efficacy, self-monitoring) (Douglas & Ammeter, 2004).

Similarly, hypothesizing that politically skilled leaders had the requisite social astuteness and interpersonal perspicacity to stimulate team success, Ahearn *et al.* (Ahearn, Ferris, Hochwarter, Douglas, & Ammeter, 2004) found that child welfare casework teams led by politically skilled leaders performed better (as measured by permanency rate, or successful placement of children into permanent living situations) than those teams led by non-politically skilled leaders.

In further support of the influential role of leaders' political skill on leadership effectiveness, researchers (Snell, Tonidandel, Braddy, & Fleenor, 2014) have found that leaders' political skill demonstrated incremental predictive validity in predicting managerial effectiveness above and beyond traditional managerial skills (*i.e.*, administrative skills, technical skills, human skills, citizenship behavior; Scullen, Mount, & Judge, 2003). Further, quantitative research concluded that plant managers' effectiveness resulted from the combination of relationship development, their effective (*i.e.*, unobtrusive) use of power, and political skill (Smith *et al.*, 2009), the latter of which is likely a driver of both relationship development and leaders' effective use of power (*e.g.*, Ferris *et al.*, 2012; Martinez, Kane, Ferris, & Brooks, 2012).

Further, research has been undertaken to examine the manner in which leaders in possession of political skill engender effectiveness outcomes. As such, it has been hypothesized that leaders in possession of political skill induce followers' perceptions of organizational support by way of their apparent sincerity, access to additional resources, and ability to present their behaviors as fair and in the best interest of others (*e.g.*, followers). In turn, these perceptions were hypothesized to result in auspicious workplace attitudes (*i.e.*, trust, job satisfaction, (lack of) organizational cynicism) and subjective indicators of leader effectiveness (*i.e.*, organizational commitment) (Treadway, Hochwarter, Ferris, Kacmar, Douglas, Ammeter, & Buckley, 2004). Empirical evidence indicated that leader political skill was positively related to followers' perceptions of organizational support, which in turn, resulted in

reduced organizational cynicism and increased job satisfaction, and ultimately, heightened levels of organizational commitment.

More recently, Ewen and colleagues (Ewen, Wihler, Blickle, Oerder, Ellen, Douglas, & Ferris, 2013) examined (followers' perceptions of) leader behavior as the mechanism through which leader political skill impacted leader effectiveness outcomes. Results indicated that leaders' political skill was positively related to leader effectiveness and follower satisfaction (*i.e.*, a more subjective, affective conceptualization of leader effectiveness; DeRue, Nahrgang, Wellman, & Humphrey, 2011) through followers' perceptions of the extent to which leaders engaged in transactional and transformational leadership behaviors. Additionally, Blickle, Meurs, Wihler, Ewen, and Peiseler (2014) found that leaders with political skill are more effective at fostering follower attributions of leaders' charisma and effectiveness.

Similarly, consistent with both Smith *et al.* (2009) and Ewen *et al.* (2013), research has found that leaders with political skill are more effective at mobilizing their positional (*i.e.*, legitimate) power in a manner that is perceived by followers as considerate and respectful (*i.e.*, consideration; Bass, 1990) and goal-oriented and structured (*i.e.*, initiating structure; Bass, 1990). In turn, followers who perceived their politically skilled leaders to have mobilized their positional power in efforts to initiate structure and provide consideration for them reported heightened levels of job satisfaction (*i.e.*, a subjective measure of leader effectiveness) (Blickle, Kane-Frieder *et al.*, 2013). Moreover, underpinned by socioanalytic theory (Hogan & Shelton, 1998), Ewen and colleagues (Ewen, Wihler, Kane-Frieder, Blickle, Hogan, & Ferris, 2014) found that politically skilled leaders engender followers' ratings of institutional effectiveness and follower job satisfaction through their use of initiating structure behaviors.

Finally, in an effort to synthesize the small body of research examining the mechanisms through which leader political skill engenders various leader effectiveness outcomes, we posit a multilevel model (Figure 11.3) in which politically skilled leaders are thought to engage in effective leadership behaviors, which in turn result in ratings of objective and subjective leader effectiveness. The model also suggests that objective leader behaviors are perceived differently by individual followers, and these perceptions of leaders' behavior result in followers' workplace attitudes (*e.g.*, perceived organizational support), which in turn are thought to influence objective and subjective indicators of leader effectiveness. Finally, followers who are politically skilled are hypothesized to perceive leaders' behaviors as more instrumental in their future successes

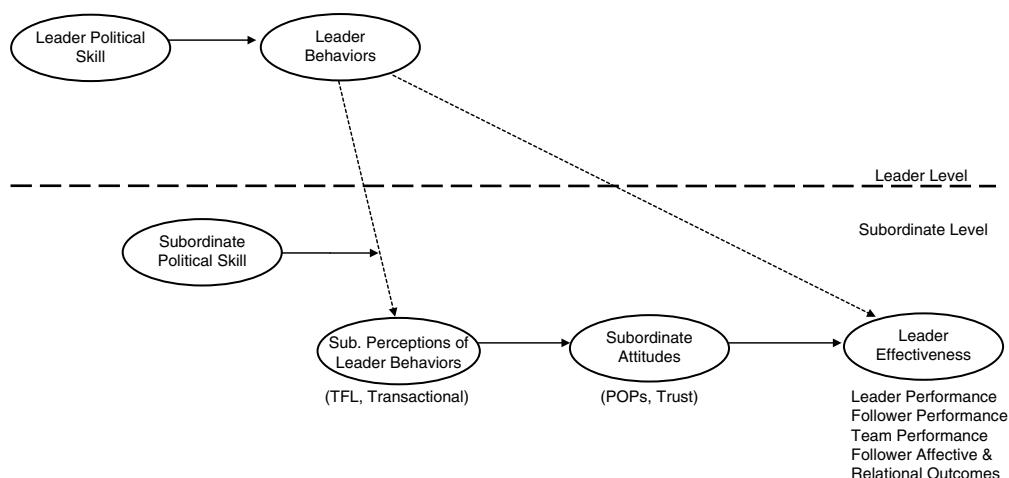


Figure 11.3 Multilevel theoretical model of leader political skill, transactional and transformational leader behavior, and leadership effectiveness

and therefore experience heightened positive attitudes toward their leaders and organizations, and ultimately perform more effectively.

More specifically, as a function of their interpersonal influence and social astuteness, politically skilled leaders are hypothesized to engage in effective leadership behaviors (e.g., transformational leadership, initiating structure, consideration; Piccolo, Bono, Heinitz, Rowold, Duehr, & Judge, 2012), as they are attuned to what behaviors would be most effective at eliciting desired outcomes from their followers. Additionally, the behaviors of politically skilled leaders should be appropriate and well-perceived by followers given that politically skilled leaders are able to present their behaviors and influence attempts in an apparently sincere, genuine, and trustworthy manner (Ferris et al., 2005).

However, the behaviors of politically skilled leaders should be more accurately perceived and interpreted by followers who also possess high levels of political skill. In turn, followers who perceive their leaders to be engaged in well-intentioned and situationally appropriate behaviors should experience positive attitudes toward both their leader (e.g., trust) and their organization for which their leader acts as an agent (e.g., perceived organizational support; Treadway et al., 2004).

Further, followers with positive attitudes toward their leader and concomitantly, their organizations, should perceive their leader as more effective especially as politically skilled leaders are instrumental to followers' organizational successes via access to additional resources, growth opportunities, and so forth. Here, in keeping with comprehensive reviews

and syntheses of leadership literature (DeRue et al., 2011), we define leadership effectiveness broadly as affective sentiments (e.g., job satisfaction; career satisfaction), relational assessments (e.g., leader-member exchange), objective and/or subjective assessments of leader, follower, and/or team performance (e.g., individual task and contextual performance; team sales performance), or some overall assessment of a leader's effectiveness (e.g., overall leader effectiveness).

For example, in keeping with this broad definition of leader effectiveness and the relationships specified in Figure 11.3, followers experiencing positive attitudes as a result of politically skilled leaders' behaviors should demonstrate heightened performance and experience heightened levels of job satisfaction and work relationship quality with their leaders. Taken together, leader political skill is hypothesized to influence leader effectiveness through leaders' selection and execution of appropriate leadership behaviors as well as through followers' perceptions of and resultant attitudes they form regarding leaders' use of certain behaviors.

FUTURE PERSPECTIVES

Antecedents

Although research proliferated over the last two decades has made strides in defining, delineating, and documenting the effects of political skill for both those in its possession as well as on others, there exist numerous opportunities for continued

research. First, research should continue to examine the antecedents of political skill especially with regard to the individual dimensions of political skill and whether and how they develop over time. For example, both need for achievement and need for dominance seem like natural drivers of the networking ability dimension of political skill whereas need for affiliation may precede individuals' development of apparent sincerity.

Thus, future research should continue to identify additional categories of antecedents in addition to the control, perceptiveness, affability, and active influence categories of dispositional antecedents identified by Ferris et al. (2007). Moreover, research should examine whether and how individuals develop political skill over time. Case studies of individuals considered to be quintessentially politically skilled may be influential in this regard and may serve to expose key dispositional and developmental antecedents that have been otherwise overlooked and/or undetected.

Dimensions of Political Skill

Notable opportunities exist to examine the differential predictive validity of the political skill dimensions. It is likely that researchers may find that one or two dimensions of political skill dominate the relations with examined outcomes should they examine specific dimensions of political skill that explicitly match the domain of the outcome of interest. For example, while political skill in the aggregate has demonstrated auspicious relationships with career success (Todd et al., 2009), strain reduction (Perrewé, Zellars et al., 2005), and leader effectiveness (Douglas & Ammeter, 2004), it is likely that certain dimensions of political skill are primarily responsible for the observed effects. Specifically, networking ability and interpersonal influence may be the dimensions most strongly related to politically skilled individuals' career success, social astuteness the dimension most strongly related to strain reduction, and apparent sincerity and interpersonal influence the dimensions most strongly related to leader effectiveness. Thus, given that certain dimensions of political skill are more logically related to certain criterion, future research should focus on developing theory to explicate the role of the political skill dimensions on established outcomes.

Mechanisms

Additionally, there exist numerous opportunities to examine the mechanisms and intermediate linkages through which politically skilled individuals

affect outcomes for themselves and others. Most notably, researchers should begin to examine the behaviors that politically skilled employees or leaders engage in that sets them apart from their less politically skilled peers (or leaders) and ultimately translate into organizational success (and leadership effectiveness). While efforts to link leader political skill to leader effectiveness through followers' perceptions of leaders' behavior have been successful (e.g., Blickle, Kane-Frieder et al., 2013), there is a surprising absence of research examining the mediating mechanisms through which politically skilled individuals achieve desirable outcomes for themselves in the workplace. Thus, researchers that undertake research concerned with what politically skilled individuals actually *do* or refrain from doing would make a substantive contribution in addressing one of the most notable gaps in the political skill literature.

Similarly, researchers have argued that politically skilled individuals are able to attract and influence others as a result of the calming self-confidence and personal security that they are hypothesized to exude (e.g., Liu et al., 2007); nonetheless, while theoretically grounded, these explanatory mechanisms have not been explicitly measured. Along these lines, while researchers have argued that individuals experience less strain as a result of the increased control and personal security afforded to them by their possession of political skill (e.g., Perrewé et al., 2005), researchers have failed to explicitly examine the mechanisms through which political skill operates on individuals' strain reduction. Specifically, it is not clear whether political skill aids in the primary, secondary, or coping processes. For instance, it has been argued that politically skilled individuals experience less strain because they have a keen understanding of the workplace environment (Ferris et al., 2005), which in essence seems to suggest that upon primary appraisal (i.e., 'Is this stimulus stressful?'; Lazarus & Folkman, 1984) politically skilled individuals may not perceive certain stimuli as stressful at all.

Nonetheless, other researchers have asserted that politically skilled individuals experience less strain as a function of their ability to determine how to 'get by' or 'solve the immediate problem' (Perrewé et al., 2005). In this regard, political skill is implicitly conceptualized as helpful during the secondary appraisal of a stressor (i.e., 'Do I have the resources needed to cope with this stressor?'; Lazarus & Folkman, 1984). Finally, others have argued that politically skilled individuals have additional access to resources be they tangible or intangible (e.g., control; personal security) (Harvey et al., 2007). Thus, according to this argumentation, political skill assists individuals

in the coping process. Taken together, there exist numerous opportunities to more explicitly explicate the manner in which political skill operates on one's self and others. For example, future research could be designed to assess whether more politically skilled individuals perceive equally objective stimuli as more or less stressful as their less politically skilled counterparts.

Political Skill and Leadership

Political skill is a predictor of leader effectiveness. Future research should continue to examine why such leaders are deemed more effective. One more recent notion is that they provide subordinates with political support and help them navigate the murky waters of the political arena. It could be hypothesized that subordinates of politically skilled leaders would have better understanding of the goings on around them, more access to resources, better opportunities to demonstrate their performance, better visibility with regard to career advancement opportunities, and sponsorship from a well-connected, well-respected supervisor. Nonetheless, future research should explicate these suppositions so as to determine how politically skilled leaders evoke high performance from their subordinates.

Additional directions for future research on political skill and leadership are outlined by Kimura (2015).

Political Skill and the Human Resources Management Function

Switching gears, opportunities exist to examine the predictive validity of political skill with regard to the hiring process. To date, two field experiments have offered preliminary support for the use of the political skill inventory (*PSI*) in predicting job incumbents' performance (Blickle, Von Below, & Johannsen, 2011) as well as yearly income (Blickle & Schnitzler, 2010). Nonetheless, research should examine how politically skilled individuals perform within actual interview settings. For example, are politically skilled individuals better able to disguise disinterest, misfit, and/or lack of experience? Do politically skilled individuals make better interpersonal connections with their interviewer(s) and therefore perform better when interviews incorporate some types of unstructured or less-structured elements such as rapport building into their interviews?

Moreover, subsequent research could examine whether those individuals who were selected for

the job based on their political skill subsequently performed well in the months and years following their initial hiring especially as compared to those who were selected on the basis of other established predictors of incumbents' performance. Nonetheless, it warrants mention that some of the aforementioned research questions would require non-survey-based and longitudinal research designs, both of which are for the most part uncharacteristic of the political skill literature (more on this below).

Along these lines, researchers should more closely examine how individuals develop political skill and concomitantly, ways in which organizations could tailor their formal management training and career acceleration programs to incorporate political skill training. To this end, researchers have found that developmental experiences (i.e., mentoring) positively relate to individuals' political skill (Ferris, Bickel et al., 2008). Thus, organizations who initiate formal mentoring programs may contribute in part to their employees' political skill development, but more research is needed to determine the manner in which organizations can more fully educate and train employees to exhibit political skill.

Methodological Issues

Further, from a more methodological standpoint, future research should examine who is best suited to assess a focal individual's political skill: oneself or others. Arguably, if individuals are especially politically skilled, others should not perceive them to be *apparently* sincere, but rather simply sincere. Moreover, those who are artfully politically skilled might not be overtly obvious networkers, but instead, may be more well-connected and intertwined in powerful networks and coalitions than is readily apparent. Thus, one would argue that the outward manifestations of political skill might not be best captured by the current political skill inventory (*PSI*; Ferris et al., 2005). Thus, perhaps future research should explore whether the current measure of political skill is properly suited for assessing other individuals' (e.g., one's supervisor, coworkers) political skill.

Finally, the political skill literature would benefit from more rigorous, and perhaps less-mainstream, research designs. Given that much of the political skill construct operates at non-visible levels of abstraction (e.g., ability to understand people), more qualitative research designs (e.g., case studies, interviews) may be best suited for determining commonalities among politically skilled individuals and how exactly political skill

manifests itself in the workplace. While behaviors deemed politically skilled may be more nuanced depending on the organization in which individuals work, qualitative research practices may be helpful in identifying key themes and characteristics that contribute to individuals' political skill and how it manifests across varied workspaces.

Further, longitudinal research designs may be helpful in explicating how politically skilled individuals exert influence over their subordinates and peers over time, ascend hierarchically, and ultimately achieve career success. All of these research questions require more elaborate and sophisticated research designs, but hold promise for unlocking some of the most intriguing ambiguities associated with the political skill construct.

Implications for Practice

There is impressive empirical evidence that political skill is necessary in order to thrive in organizational life particularly in jobs which involve influencing and leading others (Kimura, 2015). Oerder, Blickle, and Summers (2014) found that individuals in the workplace develop political skill with particular focus on the networking dimension as a result of contextual factors which promote the personal learning and development of political skill. These contextual factors are new situations with unfamiliar responsibilities, tasks, or projects that require the individual to create change, manage across organizational boundaries, build relationships with diverse people, and high-level, high latitude responsibilities. Thus, it is not always necessary to have available relevant political skill for a new job, as these skills can developed within the context of the new work context (Roberts, 2006). This is important especially for those employees who are tossed into jobs with complex social demands without sufficient training and irrespective of the level of their political skill.

CONCLUSION

In many respects, Mintzberg (1983) and Pfeffer (1981) were ahead of their times in developing political perspectives of organizations, which both argued that to be successful, and even survive in such workplace environments, individuals needed to possess political skill. Although Mintzberg and Pfeffer characterized the nature and importance of political skill, empirical research on the subject matter was absent for some time after their initial

conceptualizations because no measure of the construct existed. Thus, although the political skill construct has been around for nearly 35 years, for the first 25 of those years, there was little to no empirical research investigating this important phenomenon.

This chapter is an attempt to trace the evolution of the empirical work on political skill that has been published to date, as well as characterize the theory and research issues that remain for the future. As such, we highlighted the importance of political skill in managing impressions in the workplace, coping with stress, and promoting individuals' job performance and career success, as well as political skill's role in influence processes and leadership effectiveness. We hope this review stimulates increased interest in this important area of scientific inquiry, as there are a number of fruitful avenues for continued research.

Note

1. Conscientiousness was operationalized as 'motive to get ahead' largely as a function of the performance and achievement focus characterized by this personality trait (Blickle et al., 2008).

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Personality in Industrial, Work and Organizational Psychology: Theory, Measurement and Application

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INTRODUCTION

Personality is among the most general topics in industrial, work, and organizational psychology (and in psychology more broadly). If you pick up the latest issues of the field's top journals, the odds are good that you will find at least one article measuring and studying a personality trait as a predictor, moderator, or a control variable, whether the topic is innovation, performance rating biases, or work-family conflict. Across psychology, this status is unique to personality. The breadth of researchers studying personality (even tangentially) has made the knowledge base of personality science so voluminous that even summarizing personality's meta-analyses in IWO psychology is a hefty endeavor (cf. Wilmot, 2017). Indeed, it is almost hard to imagine that the relevance of personality and its measurement could have ever seemed as dismal as it did in the 1960s and 1970s (e.g., Guion & Gottier, 1965; Mischel, 1968). Surging back from seeming oblivion, personality psychology has profited tremendously from the interest it drums up across topics in IWO psychology.

At the same time, personality psychology finds itself in an awkward position. Right now, the lion's share of personality research is being produced by scholars whose expertise really lies elsewhere. Among the 'tangential' personality researchers,

citations to the 'core personality' literature or the 'personality at work' literature frequently do not extend beyond the influential work establishing a five dimensional taxonomy for personality (e.g., Costa & McCrae, 1992; Digman, 1990; Goldberg, 1993) or Barrick and Mount's (1991) seminal meta-analysis of personality's validity for predicting performance. Assuredly, these articles are fantastic in their own right, and re-reading them still stimulates new insights for us. But we would desperately hope that an additional quarter-century of research on what personality is and how it generally guides thoughts, feelings, and behaviors in the workplace could be informative for the researcher trying to understand why agreeable people are less likely to retaliate to abusive supervision, or how open individuals learn more effectively in training, or when conscientious leaders are most likely to derail. Or, if not, we would desperately hope that the next quarter-century of personality research will fare better.

The purpose of the present chapter is to offer an integrated presentation of contemporary theories and findings in personality psychology. It is by no means an exhaustive accounting of all that IWO psychology knows about personality nor an apologist's defense of the importance of personality (though for excellent examples of each, see Barrick, Mount, & Judge, 2001; Hough & Furnham,

2003; Ones, Dilchert, Viswesvaran, & Judge, 2007; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007; Tett & Christiansen, 2007). Rather, our ambition in this chapter is to introduce new and refined conceptualizations of personality that will allow scholars across areas of IWO psychology to incorporate personality in their research in novel and sophisticated ways. As we look across topics in personality theory and research, we also highlight potential areas for 'core' personality researchers to further develop theory and empirical research.

TRAIT STRUCTURE AND THEORETICAL UNDERPINNINGS

Perhaps *the* landmark discovery of personality psychology in the twentieth century was finding that personality traits can be well-described with a five factor taxonomy (consisting of the traits of neuroticism, extraversion, openness, agreeableness, and conscientiousness). This taxonomy has unified the field around a common language for describing traits, whose organization had previously been specific to a given theorist or inventory. As a result, when psychologists across domains are unsure about which personality traits might be relevant for their research, they can turn to the Five Factor Model (FFM) and find a useful delineation of traits that will provide adequate coverage across the personality spectrum.

No sooner had the five factor taxonomy emerged than personality psychologists began highlighting that traits are arranged hierarchically, with traits existing at both broader and narrower levels than the Big Five (Digman, 1997; Eysenck, 1993). Narrower than the Big Five, researchers recognize both facet traits (e.g., sociability, positive emotionality, assertiveness, and energy within extraversion; Costa & McCrae, 1995; Davies, 2012) and aspects (e.g., enthusiasm, comprising the shared variance of sociability and positive emotionality facets; DeYoung, Quilty, & Peterson, 2007). Broader than the Big Five, researchers have identified two meta-traits of Alpha (alternatively labeled 'Stability' and comprising Emotional Stability, Conscientiousness, and Agreeableness) and Beta (alternatively labeled 'Plasticity' and comprising extraversion and openness; DeYoung, 2006; Digman, 1997). Researchers have even found correlations between Alpha and Beta and suggested that a General Factor of Personality (GFP) lies atop the hierarchy of personality (Musek, 2007; Rushton, Bons, & Hur, 2008), though the GFP appears to

largely reflect a rater-method factor and inventory-specific response sets (Anusic, Schimmack, Pinkus, & Lockwood, 2009; L. Chang, Connelly, & Geeza, 2012; Davies, Connelly, Ones, & Birkland, 2015). Moreover, a similar structural model seems well equipped to characterize even abnormal personality traits (Markon, Krueger, & Watson, 2005). Though researchers disagree about the number and defining nature of traits within a given level of the hierarchy (e.g., Ashton et al., 2004; Eysenck, 1993) or which hierarchical level is optimal for studying personality (e.g., Mershon & Gorsuch, 1988; Schneider, Hough, & Dunnette, 1996), the consensus that the field has generally reached about how to hierarchically organize most traits is quite remarkable.

While personality research has made great strides in taxonomizing the hierarchical structure of traits, developing a theoretical understanding of what the shared variance in a factor reflects has been a thornier issue. As an analogy, though rain, wind, clouds, thunder, and lightning may covary, subsuming these events under a latent 'storm' factor does little to explain how weather patterns emerge. Despite amassing considerable knowledge about the patterns of covariance in personality traits, we know relatively little about why it is that individuals who are sociable tend to be assertive, cheerful, and energetic, but not necessarily orderly or anxious. To the applied psychologist solely interested in maximizing performance prediction, questions about the defining nature and processes of personality factors may be esoteric and better left for the ivory tower. However, if you begin asking questions like, 'How can I encourage employees low in Openness to engage in training?' or 'Should I select on Global Conscientiousness and/or its Achievement facet?' or 'Is Agreeableness likely to predict performance in this particular job?', you quickly wade into issues about what the glue is that holds a factor's domain together. Accordingly, applied psychologists can and should reflect on the meaning, origins, and process of why behaviors, thoughts, and feelings form the *characteristic* patterns that they do.

The earliest and simplest account of latent personality factors was that each factor reflects a 'source trait' from which narrower traits are distilled (Cattell, 1946; Tellegen, 1991). For example, the Plasticity meta-trait may reflect general engagement and exploration of one's environment that manifests in social (extraversion) and intellectual/experiential realms (openness). Similarly, intellectual engagement may encompass the core of openness that in turn guides one to be reflective (the introspection facet), eschew conventions (nontraditionalism), savor aesthetic experiences (aesthetics), and so on. Whether explicitly or

implicitly, the ‘source trait’ perspective appears to be the one most commonly endorsed when, for example, researchers talk about the effect of conscientiousness on absenteeism: an underlying, core personality trait manifests in a variety of facet tendencies, whose total effects tend to inhibit people from showing up for work. In perhaps its most extreme form, the source trait perspective might view broader factors as uniquely biologically/physiologically constituted (R. R. McCrae & Costa, 1995).

Anchoring the other end of the theoretical spectrum from the ‘source trait’ perspective are network (e.g., Cramer et al., 2012; Schmittmann, Cramer, Waldorp, Epskamp, Kievit, & Borsboom, 2013) and functionalist (Denissen, Wood, & Penke, 2012; Wood, Gardner, & Harms, 2015) perspectives on personality’s structure. These perspectives note that identifying a single, source trait is the simplest of many potential explanations for why traits in a domain covary. For example, chronically experiencing feelings of anxiety and skepticism may make individuals feel depressed, which in turn inhibits self-esteem and makes their moods more labile, which impedes self-control. To proponents of such perspectives, subsuming this process under a neuroticism factor obscures the richness of the causal mechanisms linking traits in the domain. In practice, analyses using network or functionalist perspectives have typically been even more granular, typically analyzing links between (a multitude of) individual items simultaneously across FFM domains. In many ways, such network and functionalist perspectives represent social cognitive psychologists’ ‘personality processes’ side of the personality field (with ‘individual differences’ constituting the other side; R. R. McCrae, 2009 notes that this historical divide is even reflected today in the subsections of the field’s top journal). What’s more, network perspectives have argued (probably correctly) that there are likely to be individual differences in how the process unfolds over time (e.g., for some individuals, anxiety may trigger a chain of tendencies in neuroticism facets, whereas others may be set off by threatened self-esteem). The mass of indicators used has made empirical demonstrations of these perspectives nothing short of mind-boggling as wholesale accounts of why traits covary. However, these perspectives highlight the importance of considering how more complex processes could account for patterns of trait covariation in the ‘structure’ of personality traits.

Perhaps a middle-ground between the source trait approach and social cognitive personality’s descendants is recent cybernetic conceptualizations of personality. Originally introduced by Van Egeren (2009) and refined by DeYoung (2010;

2014) into Cybernetic Big Five Theory (CB5T), cybernetic perspectives argue that personality traits fundamentally capture differences in how individuals pursue their goals. Specifically, individuals (a) activate goals, (b) select actions, (c) carry out actions, (d) interpret outcomes, and (e) compare outcomes to their original goals. Note that ‘goals’ may be either conscious or unconscious but generally capture the motivators for behavior. From this vantage point, the five factors represent individual differences in distinct mechanisms operating across these stages. CB5T stands out as a theory articulating particular intra-individual processes accounting for actual inter-individual patterns of trait covariance throughout levels of the trait hierarchy. Such theoretical accounts are hard to come by in personality psychology. As such, we devote some time to understanding each of the Big Five traits through the lens of CB5T. In particular, we discuss each meta-trait, the five factor domains, and their constituent aspects and narrower facets distinguished in previous and ongoing taxonomic research (e.g., Birkland, Connelly, Ones, & Davies, 2015; Connelly, Ones, Davies, & Birkland, 2014; Davies, 2012; Roberts, Bogg, Walton, Chernyshenko, & Stark, 2004; Woo, Chernyshenko, Longley, Zhang, Chiu, & Stark, 2014). Stanek and Ones (Chapter 13, this *Handbook*) provide a compendium of how these traits align with scales from commonly used personality inventories at different levels of the personality hierarchy (meta-trait, Big Five factors, aspects, facets).

Stanek and Ones’ (Chapter 13, this *Handbook*) compendium merits an important caveat that is likely well-appreciated by anyone who has ever factor analyzed scales from a personality inventory: personality traits do not have simple structure. That is, narrow traits do not always (or even necessarily often) align uniquely with a single factor (R. R. McCrae & Costa, 1997). Rather, it is quite common to find sizable secondary (or even tertiary) factor loadings for narrow traits when exploratory factor analysis is employed, such as finding cross-loadings for neuroticism’s narrow facet of Irritability on Agreeableness factors. From a source trait perspective, these secondary loadings indicate that a narrow trait owes its origins to multiple factor domains. As a result, some past trait-taxonomists have taken pains to distinguish between ‘compound traits’ (traits aligned with multiple FFM factors) and ‘pure facets’ (traits aligned uniquely with a single FFM factor; e.g., Hough & Ones, 2001). To core personality researchers studying the etiology of traits, this distinction between singly-determined vs. multiply-determined traits is perhaps trivial, and defining a factor only by its pure facets may impoverish

our understanding of what lies at the root of a higher-order trait. However, to applied psychologists interested in studying the effects of traits on behaviors and attitudes, such distinctions are paramount in understanding the unique and combined predictive power of traits. Similarly, meta-analysts often must choose one domain or another with which to align particular scales, or to simply exclude the scale entirely. In hopes of presenting a fuller view of the traits encapsulated by a particular factor domain, in this chapter we discuss compound traits alongside their closest domains based on theory and empirical findings. Table 12.1 provides a brief overview of key traits, their definitions as well as their cybernetic functions (discussed below).

Extraversion

Nearly every personality inventory assesses extraversion in some form; it is a trait so ubiquitous that it is recognized by even Jungians (Jung, 1923). Extraversion stands out as the five factor domain with the richest and most varied theoretical conceptualizations of its nature, ranging from individual differences in arousal (Eysenck, 1973) to positive emotionality (Watson & Clark, 1997) to sociability (Ashton, Lee, & Paunonen, 2002; R. R. McCrae & Costa, 1987) to the strength of the nervous system (Gray, 1967) to external (vs. internal) orientation toward stimuli (Jung, 1923). Contemporary personality theories have converged on defining extraversion's core as reflecting sensitivity to rewards, which serves as a useful umbrella framework that incorporates many of these varied perspectives (Depue & Collins, 1999; Lucas, Diener, Grob, Suh, & Shao, 2000). Within CB5T, Extraversion's reward sensitivity plays a major role in activating goals simply because extraverts are more likely to find a given goal rewarding (DeYoung, 2014; Van Egeren, 2009). Indeed, when presented with rewards (whether they be tangible desirable objects, positive emotional experiences, or pharmacological manipulations of dopamine), extraverts tend to respond more strongly in brain activity and operant learning paradigms (Depue & Collins, 1999).

Extraversion's aspects capture different forms of reward sensitivity (DeYoung, 2014). On one hand, the assertiveness aspect (encapsulating the facets of dominance and activity) reflects sensitivity toward incentive rewards – that is, pursuing new rewards. In contrast, the enthusiasm aspect (encapsulating the facets of sociability and positive emotions) reflects sensitivity toward consummatory rewards, or the depth of one's

enjoyment of obtained rewards. In addition, the sensation seeking facet (reflecting tendencies to seek out adventure and excitement) tends to load comparably on both aspects. On the whole, the reward sensitivity core of extraversion makes the domain prime for predicting well-being and satisfaction criteria, both because extraverts may pursue obtaining more rewards and because they may be more satisfied with a given set of rewards.

Openness

Historically, openness has been the most contentious of personality domains, with questionnaire-based approaches of the FFM adopting the label of 'openness to experience' and lexical, adjective-based approaches labeling the domain as 'intellect'. Once a major point of contention among personality psychologists (Goldberg, 1994), the field now generally recognizes that intellect and experiential openness (experiencing) represent distinguishable but related aspects within a single domain. Within a cybernetic framework, how individuals pursue their goals is inherently tied to how they process information. The openness domain governs the variety and depth of information that individuals consider in pursuing their goals (DeYoung, 2014; Van Egeren, 2009).

Relative to the other five factor domains, openness has perhaps the largest collection of distinguishable narrow traits. The Intellect aspect of openness comprises facet traits related to typical intellectual engagement (intellectual efficiency) and creativity (innovation). Though personality research and ability research have typically been partitioned, the construct of the intellect aspect is closely related to cognitive ability. In contrast, facets within the experiencing aspect (i.e., experiential openness) (aesthetics, openness to sensations, openness to emotions, imagination, and variety seeking) tend to emphasize variety and depth of sensorial experiences. Finally, several facets (curiosity, depth, and nontraditionalism) load on both aspects and generally dictate whether individuals prefer complex versus simplistic engagement with the world. Though the experiencing and intellect aspects are certainly related, they appear distinct in how they relate to variables like reasoning, memory, and job performance (e.g., DeYoung, Peterson, & Higgins, 2005; Griffin & Hesketh, 2004). Thus, for IWO psychologists, the relevance of both the experiencing and the intellect aspect is likely to hinge on the cognitive complexity and sensory experiential richness demands of the job.

Table 12.1 Big Five constructs and their cybernetic functions

<i>Cybernetic function</i>	<i>Construct</i>	<i>2nd load</i>	<i>Definition</i>
Reward Sensitivity	EXTRAVERSION		Sensitivity to rewards that motivate individuals toward goal pursuit
	Sensation Seeking	O+ C–	Seeks out excitement, is adventurous
	Enthusiasm		Sensitivity to consummatory rewards; enjoyment in attaining goals
	Sociability		Seeks the company of others; is talkative, outgoing
	Positive Emotions		Experiences positive emotions such as joy, zest, cheerfulness
	Warmth	A+	Expresses affection and is gregarious
	Optimism	N–	Is hopeful; believes good outcomes are likely
	Assertiveness		Sensitivity to incentive rewards that push individuals toward reaching goals
	Dominance		Prefers to lead than to follow; seeks status
	Activity		Active and fast-paced
Exploration / Understanding	OPENNESS/INTELLECT		Seeks to explore and understand novel and complex information
	Curiosity		Investigative; seeks out new forms of intellectual play
	Depth		Prefers complexity and multi-faceted abstractions to the simplistic or familiar
	Nontraditionalism	C–	Endorses socially and politically liberal values, avoids dogmatism
	Tolerance	A+	Appreciation for differences in others' values; broadmindedness
	Openness to Experience		Explores and engages in novel sensory information
	Aesthetics		Appreciates and may be strongly moved by artwork, music, natural beauty
	Openness to Sensations		Attune to and savors sights, sounds, smells, and tactile stimuli
	Openness to Emotions	Ex+	Thinks about and interprets deeply emotional experiences
	Imagination	C–	Has an active imagination; may often day-dream or have an active fantasy life
	Variety Seeking	Ex+	Seeks out novelty, prefers variety, and avoids routine
	Intellect		Understanding abstractions and complex information
	Intellectual Efficiency		Is able to quickly solve complex problems
	Innovation	Ex+	Is creative and inventive; likes to come up with new ideas
Detecting Threats to Goals	NEUROTICISM		Sensitivity to threats manifest as negative emotions
	Withdrawal		Negative emotions prompting the avoidance of goal pursuit
	Depression		Feels sadness and hopelessness
	(Low) Self-Esteem		Lacks sense of personal worth or value
	Anxiety		Experiences chronic worry and tension
	Volatility		Negative emotions prompting the defense of goal pursuit

Table 12.1 Big Five constructs and their cybernetic functions (continued)

<i>Cybernetic function</i>	<i>Construct</i>	<i>2nd load</i>	<i>Definition</i>
	Irritability	A–	Anger-prone; ‘flies off the handle’
	Skepticism		Is vigilant in monitoring for harmful intent from others
	Lability		Experiences frequent and extreme changes in mood
	(Low) Self-Control	C–	Has difficulty restraining impulses and emotional expressions
Prioritizing Goals	CONSCIENTIOUSNESS		Prioritization of long-term goals over immediate gratification
	Dependability		Follows through on commitments despite difficulties
	<i>Industriousness</i>		<i>Diligent effort directed toward achieving long-term goals</i>
	Achievement		Works hard and is motivated; strives for difficult goals
	Cautiousness		Is careful; avoids risks
	<i>Orderliness</i>		<i>Maintenance of order and predictability to avoid uncertainty</i>
	Order		Is neat, tidy, and organized; pays close attention to details
	Perfectionism	N–	Hypervigilance when order or goal pursuit are threatened
Coordination of Goal Pursuit	AGREEABLENESS		Willingness to coordinate goal pursuit with others
	Trusting	N–	Believes others are honest and well-intentioned
	<i>Compassion</i>		<i>Emotional responsiveness to others</i>
	Nurturance		Tendency to be altruistic, sympathetic, and helpful
	Interpersonal Sensitivity	Ex+	Sensitive to others’ moods and emotions
	<i>Politeness</i>		<i>Inhibition of harmful behaviors that threaten coordination of goal pursuit</i>
	Cooperation		Prefers cooperation, works well with others, strives for harmony
	Non-manipulative		Honest, sincere, and forthcoming when dealing with others
	Aggression	N–	Willing to hurt others: vindictive rather than forgiving
	Modesty		Tendency to be humble; e.g., does not brag

Neuroticism

Neuroticism encapsulates tendencies to experience a slew of negative emotions, ranging from anxiety to anger to depression to frustration to self-doubt. Negative emotions serve an important cybernetic function in signaling that goal pursuit has been, is, or will be threatened (DeYoung, 2014; Van Egeren, 2009). With more protracted tendencies to experience negative emotions, highly neurotic individuals are likely to be more defensive to threats or simply believe the outlooks for success in pursuing their goals to be too dismal to begin.

DeYoung (2014) argued that neurotic individuals’ defensive responses come in two general forms that align with its two aspects. First, the withdrawal aspect captures passive avoidance in response to

approach/avoidance conflicts. Accordingly, when faced with the conflict between a desired reward and an imminent threat, individuals high on withdrawal are susceptible to tension (the anxiety facet), self-doubt (low self-esteem), and may believe taking action to be entirely futile (depression). In contrast, the volatility aspect encompasses active defenses in response to potential threats. That is, whereas individuals high in withdrawal are likely to succumb to goal threats, volatile individuals show hyper-reactivity to threats in outbursts of anger (the irritability facet), fluctuating emotions (lability), distrusting others (skepticism), and impulsive outbursts (low self-control). For IWO psychologists, these components make neuroticism particularly relevant for predicting satisfaction/well-being and behaviors when individuals are under pressure.

Conscientiousness

In cybernetics, individuals do not typically consider goals in isolation. Rather, individuals often must weigh the benefits of pursuing goals, some of whose rewards may be delayed and some of which provide more immediate gratification. Van Egeren (2009) and DeYoung (2014) have argued that conscientiousness serves a core function in differentiating those who protect long-term goals from disruption. Thus, highly conscientious individuals are more likely to sign up for a difficult assignment or tidy up their workspace because they value the long-term rewards associated with these actions rather than the immediate rewards from procrastination. Such conceptualizations square with findings from the meta-analyses of the early 1990s where conscientiousness emerged as the trait most predictive across performance criteria and job families.

Narrower traits within conscientiousness tend to align with two aspects. First, the traits associated with industriousness (achievement, cautiousness, and dependability) have a common core in prioritizing long-term goals over short-term goals, whether it takes the form of fulfilling one's obligations (dependability), working hard and accepting challenges (achievement), or inhibiting impulsive behaviors (cautiousness). Second, although narrower in scope, the orderliness aspect (comprising only the order and perfectionism facets) captures a meticulousness in following rules and maintaining tidiness that aligns with long-term goal pursuit. Although orderliness facets tend to load strongly on the general conscientiousness factor (Dudley, Orvis, Lebiecki, & Cortina, 2006), orderliness traits are more modest predictors of performance across jobs. In contrast, facets within industriousness (particularly achievement) tend to produce stronger zero-order correlations with performance, suggesting that some specific variance in these traits contributes to prediction beyond the broad conscientiousness factor.

Agreeableness

As social animals, humans coordinate their goal pursuit with one another. In CB5T, agreeableness captures variation in individuals' willingness to coordinate goals with others. At the low end of the trait, disagreeable individuals are most likely to pursue their own self-interests over concern for others and may be willing to manipulate others to achieve their own goals. Not surprisingly, agreeableness tends to positively predict performance criteria aligned with teamwork, cooperation, and interpersonal citizenship and negatively predict

interpersonal deviance (e.g., Barrick et al., 2001; Berry, Ones, & Sackett, 2007). Thus, agreeableness stands out as an important trait for jobs with frequent interpersonal interactions that require tact, diplomacy, and sensitivity (e.g., customer service positions).

The aspects of agreeableness loosely partition facets into cognitive versus emotional mechanisms of goal coordination. Politeness (the more cognitively oriented aspect) encompasses the facets of cooperation, non-manipulativeness, aggression, and modesty; the general tenor of the aspect is refraining from insidious or disrespectful behavior toward others. In contrast, compassion captures emotional responses that promote the support of others, as apparent in its nurturance and interpersonal sensitivity (empathy) facets. DeYoung, Weisberg, Quilty, and Peterson (2013) note that these two aspects can perhaps be best understood within Wiggins' (1979) interpersonal circumplex, which places agreeableness and dominance (or extraversion's assertiveness aspect) as two orthogonal axes on which most interpersonally oriented traits can be mapped. Specifically, whereas the compassion facet combines agreeableness with dominance, the politeness facet combines agreeableness with submissiveness.¹ Thus, the relevance of a particular agreeableness aspect may depend largely on whether individuals are in leadership or followership roles.

COMPOUND PERSONALITY TRAITS

Beyond some of the compound traits we discussed above in connection with the Big Five they were most closely aligned with, there are some major compound traits that merit a more in-depth discussion. Here we review core self-evaluations, proactive personality, integrity, self-monitoring, emotional intelligence, optimism, and mindfulness.

Core Self-Evaluations

Judge and colleagues (e.g., Judge, Locke, & Durham, 1997) have proposed that people make fundamental evaluations about their own self-worth that are central to their identity and that permeate how they view the world. These core self-evaluations (CSEs) form a base of assumptions that individuals form about their capabilities and what they can expect from the world and from others. Judge et al. identified four stable individual differences identified in the research literature

that reflect the fundamental, self-evaluative, and broad nature of these CSEs: self-esteem, generalized self-efficacy, neuroticism, and locus of control. These four individual differences tend to be positively correlate, leading Judge and colleagues to argue that these tendencies can be subsumed under the umbrella of a general factor of CSEs. Subsequently, a large body of research has shown that people with positive CSEs tend to be more satisfied at work and with life in general, are more motivated and committed employees, perform better, avoid counterproductivity, are less sensitive to stressors and strain, and generally poop rainbows (C.-H. Chang, Ferris, Johnson, Rosen, & Tan, 2012; Judge & Bono, 2001).

More recently, researchers have suggested that CSEs effects on performance and satisfaction can be better understood within an approach/avoidance framework (Ferris, Rosen, Johnson, Brown, Risavy, & Heller, 2011). CSEs have been argued to both promote approach motivation (through enhancing sensitivity to rewards) and to diminish avoidance motivation (with strong beliefs in one's capability and self-worth making negative information less threatening). However, the nomological net of CSEs corresponds much more closely to avoidance motivation, with neuroticism aligning much more strongly with neuropsychic structures involved in inhibition and avoidance rather than activation (Corr, DeYoung, & McNaughton, 2013). Empirically, findings suggest CSEs operate markedly more strongly through avoidance than through approach motivations, though some of its effects are mediated by approach motivation (Ferris et al., 2011).

The core self-evaluations construct is not without critics (C.-H. Chang et al., 2012; Chen, 2012), who have voiced three recurrent concerns about CSEs and its associated theory. First, it remains somewhat unclear whether more or fewer facets could be used to define CSEs. For example, Johnson, Rosen, Chang, and Lin (2015) proposed that locus of control is more fittingly conceptualized as a core evaluation of the environment and an empirically separate trait (though it may still have important interactions with CSEs). Second, researchers have noted that subsuming CSE facets beneath a general factor could obscure more intricate mediating mechanisms that link CSEs to behaviors and attitudes. For example, Chen, Gully, and Eden (2004) noted that generalized self-efficacy relates more strongly to motivational variables, whereas self-esteem is more closely tied to affect, suggesting that more fine-grained differentiation is likely present among the facets. Third, considerable debate remains around whether CSEs are a reflective construct (i.e., CSEs cause individuals' standing on neuroticism, generalized self-efficacy, self-esteem, and locus of control) or

a composite construct (i.e., the four facets contribute to an overall CSE). Even further is the possibility that a more complex pattern of causal relations exists among the variables (e.g., perhaps neuroticism is a risk factor for developing low self-esteem, which in turn impedes self-efficacy and creates an external locus of control; this and many other causal pathways could produce a general factor across the four facets).

To be certain, bringing empirical scrutiny to these possibilities is important for the future of CSE theory and research. To be fair, however, these same criticisms could be leveled at any of the dimensions of the Big Five: (for example) is ambition a facet belonging within Conscientiousness? how much predictive and theoretical power is lost if Ambition's unique effects beyond Conscientiousness are not modeled? how are Ambition and the other Conscientiousness facets causally linked? As is the case with the Big Five, CSEs remain somewhat of an open construct, whose defining members should continue to evolve with empirical research. Similarly, studying CSEs as a general construct should not preclude studying the unique effects of its constituent facets. Rather, the facets within CSEs represent a family of traits that are best understood when studied in tandem rather than isolation, even if the causal links between individual members are yet unclear. Perhaps most importantly, the literature on CSEs is a critical reminder that dispositions form the basis for much of the way that people evaluate their lives and their environment.

Proactive Personality

Emerging from vocational psychology, scholars have identified 'proactive personality' as a highly relevant trait for predicting career success and advancement (Seibert, Crant, & Kraimer, 1999). Proactive individuals take initiative and build momentum to positively change their current circumstances rather than being passive in accepting the current circumstances. As the modern workplace has shifted from career-long employment to shorter-term, protean careers, proactive individuals are more inclined to actively seek out novel opportunities to improve their skillset and their work arrangements. Accordingly, individuals high on proactive personality tend to be promoted more frequently, have higher salaries, and are more satisfied in their careers (Fuller & Marler, 2009; Seibert et al., 1999). In addition, proactive individuals tend to perform more effectively via both task and contextual performance (Fuller & Marler, 2009; Tornau & Frese, 2013).

The nature of proactive personality as a trait aligns closely with both the achievement facet of conscientiousness and the assertiveness aspect of extraversion, positioning proactive personality squarely as a compound personality trait. Meta-analytic findings support these relationships with conscientiousness and extraversion, along with weaker correlations with openness and emotional stability (Tornau & Frese, 2013). Notably, other researchers have labeled this intersection between high conscientiousness and high extraversion as ‘ambition’ (e.g., Hough & Ones, 2001), though it remains unclear how proactive personality and more traditional measures of ambition correlate. Scholars dissent on how much incremental prediction of job performance proactive personality provides beyond the Big Five personality traits, even after meta-analytic hierarchical regressions (Fuller & Marler, 2009; Tornau & Frese, 2013). These disparate findings appear tied to differences in meta-analytic coding and inclusion criteria, with proactive personality showing little incremental validity when (a) multi-method measures are used and (b) when proactive personality scales are used rather than assessments of particular proactive behaviors. Complicating matters further is the fact single measures of Big Five traits are not perfectly veridical trait indicators, meaning that studies of proactive personality’s incremental prediction likely have not stripped away all of the predictive power of the Big Five when only administering a single measure (Connelly & Ones, 2007). In light of these findings, proactive personality is perhaps best viewed as a formative construct comprising the linear (and possibly interactive) effects of Conscientiousness (particularly the Achievement facet) and Extraversion (particularly the Assertiveness aspect), with potential additional effects from Openness and Emotional Stability. Though such formative constructs may be potent predictors of many important life outcomes, researchers may provide clearer theoretical explication by isolating the effects of proactive personality’s constituent components.

Integrity

The personality construct of integrity refers to honesty and trustworthiness (Goldberg, Grenier, Guion, Sechrest, & Wing, 1991). Behaviorally, individuals of high integrity adhere to societal standards of ethical conduct and avoid illegal or immoral activities. Integrity tests are measures specifically developed to assess this construct, typically among job applicants, though integrity measures for employee assessments can also be found (cf. Ones & Viswesvaran, 2001). Integrity

tests can be classified into two categories: overt tests and personality-based tests. Overt tests include theft and counterproductivity-related attitude items and have been termed ‘clear-purpose tests’, because test-takers can readily identify the purpose of these tests as screening undesirable job candidates likely to engage in disruptive behaviors at work. On the other hand, personality-based tests are composed of traditional personality scale items and have been termed ‘disguised-purpose tests’ because test-takers are unaware of the purpose for which the test is used.

Thirty years ago, integrity tests were merely regarded as paper-and-pencil alternatives to the polygraph as their main purpose was identify individuals of low integrity and honesty in screening job applicants (Ones, Viswesvaran, & Schmidt, 1993). Practice-oriented developmental history of most integrity tests also added to poor understanding in academic circles. Meta-analyses and primary research since have identified the Big Five constructs that integrity relates to as conscientiousness, agreeableness, and emotional stability (neuroticism reversed). All three traits involve norm-favoring elements. Conscientiousness plays an inhibitory role in controlling wayward impulses. Its facet traits of cautiousness and dependability help inhibit impulses and prioritizing fulfillment of obligations over immediate gratification. Agreeableness underlies interpersonal aspects of integrity. Lack of compassion and politeness are explanatory variables in understanding transgressing against other individuals versus behaving within the confines of acceptable social conduct. Neuroticism encompasses maladaptive defenses against threats, including those that violate societal norms. There is covariation between these three of the Big Five (Digman, 1997): Factor Alpha (also referred to as stability or socialization; e.g., DeYoung, 2006) represents well-adjusted functioning in motivational, social, and emotional domains. Factor Alpha is the source trait of integrity (Ones, 1993, Ones, Viswesvaran, & Dilchert, 2005). Integrity reflects whether societal values are internalized, individuals are well socialized, and antisocial behaviors are typically well controlled.

Integrity is an excellent predictor of avoiding a broad spectrum of counterproductive work behaviors (Berry, Sackett, & Wiemann, 2007). This is not surprising because Factor Alpha has been shown to predict externalizing behaviors well (e.g., DeYoung, Peterson, Séguin, & Tremblay, 2008). (Externalizing behaviors encompass general counterproductivity, delinquency, antisocial behavior, drug and alcohol abuse, and impulsive behaviors; Krueger, Hicks, Patrick, Carlson, Iacono, & McGue, 2002.) Lending further credence to this

finding are the results from meta-analyses that show that the Big Five traits underlying Factor Alpha are potentially predictive of counterproductive work behaviors (Berry, Carpenter, & Barratt, 2012; Berry, Ones, & Sackett, 2007).

Integrity is also a strong predictor of overall job performance (Ones et al., 1993) largely because avoiding counterproductivity is a major dimension of job performance (Rotundo & Sackett, 2002; Viswesvaran & Ones, 1999) and because norm-favoring behavior is helpful for interpersonal behaviors that comprise other productive facets of performance.

There are other criterion or job-focused personality scales (Ones & Viswesvaran, 2001) that tap into Factor Alpha, but with heavier tilts toward agreeableness and emotional stability (e.g., Customer service and stress tolerance scales, respectively). Not surprisingly, their criterion-related validities mimic integrity tests for the criterion of overall job performance (Ones & Viswesvaran, 2001).

Self-Monitoring

There are differences in the degree to which individuals vary in their self-presentational tendencies. Self-monitoring describes willingness and ability of individuals to engage in the expressive control in public self-presentations (Snyder, 1987). High self-monitors are described as being sensitive to situational cues and able and willing to modify their expressive behavior according to contextual demands. In contrast, low self-monitors are less responsive to situational cues and rather behave in ways congruent with their internal attitudes and dispositions. Originally conceptualized as a dichotomous/binary construct, recent research using modern taxonomic methods indicates that self-monitoring is actually a continuous multidimensional construct (Wilmot, 2015).

An unpublished meta-analysis has suggested that self-monitoring is related to extraversion ($\rho = .44$) but not to neuroticism, agreeableness, or conscientiousness (no relations were reported for Openness; Schleicher & Day, 2002). But such research presumes that self-monitoring measures assess a unitary construct. They do not, as self-monitoring is comprised of two orthogonal dimensions of self-presentational behavior: *acquisitive* and *protective* self-monitoring (Lennox, 1988). Acquisitive Self-Monitoring is equivalent to Factor Beta, the higher-order meta-trait defined by the shared variance of extraversion and openness. Protective self-monitoring measures tap into Factor Alpha (Wilmot, DeYoung, Stillwell, & Kosinski, 2016).

Unfortunately, most of the research on self-monitoring in work settings has not distinguished between acquisitive and protective self-monitoring. Overall self-monitoring is modestly, positively associated with leadership emergence and job involvement, and negatively correlated with organizational commitment (Day, Schleicher, Unckless, & Hiller (2002). We expect that Acquisitive self-monitoring be related to proactive career behaviors and outcomes (e.g., advancement, protean career orientation), social effectiveness, and leadership emergence and performance. On the other hand, protective self-monitoring, given its links to Factor Alpha should relate to avoiding CWB.

Emotional Intelligence

Emotional intelligence has its roots in early research on social abilities and competencies and some date it back to Thorndike's (1920) conceptualization of 'social intelligence' (Locke, 2005; Van Rooy & Viswesvaran, 2004). Scientific interest in studying emotional intelligence (EI) has started to grow in the 1990s with Daniel Goleman's (1995) popularization of the topic and Mayer and colleagues' (Salovey & Mayer, 1990) scientific work on EI (Mayer, Roberts, & Barsade, 2008). Ever since, EI has received considerable attention, not only among academics but also, or especially so, among practitioners. The appeal of EI may be explained by the hope to find an antagonist to the conventional conceptualization of intelligence (i.e., general mental ability) and its role as being one of the best predictors of job performance (Schmidt & Hunter, 1998). Although popular claims that EI is more important for success in life than intelligence (Goleman, 1995) could not be supported by empirical research (Zeidner, Roberts, & Matthews, 2008), many researchers agree that it is a concept worthy of investigation.

The scientific literature on EI has witnessed a lot of debate around how best to define, conceptualize, and measure the construct (Cherniss, 2010; Matthews, Roberts, & Zeidner, 2004; Mayer et al., 2008; Zeidner et al., 2008). While some define EI as a set of abilities (ability EI), others see it as a combination of emotion-related dispositions and self-perceptions (trait EI; also referred to as mixed EI) (Joseph & Newman, 2010; Mayer et al., 2008; Matthews et al., 2004). Notably, correlations between measures of ability EI and trait EI are low, suggesting that they are indeed distinct constructs (Joseph & Newman, 2010). The predominant ability-based model is the four-branch model of EI conceptualizing EI as the ability to (a) perceive emotions in oneself and others, (b)

use emotions to facilitate thought, (c) understand emotions, and (d) to manage and regulate emotions (Mayer & Salovey, 1997; Salovey & Mayer, 1990). Under the ability framework, EI is typically assessed with performance-based tests, but also with self-report scales (Joseph & Newman, 2010; Mayer et al., 2008). In the present chapter our focus is on conceptualizations of EI as a component of personality.

Various researchers have conceptualized EI under a personality rather than a cognitive ability framework (Bar-On, Brown, Kirkcaldy, & Thomé, 2000; Petrides & Furnham, 2000, 2001; Schutte, Malouff, Hall, Haggerty, Cooper, Golden, & Dornheim, 1998; Tett, Fox, & Wang, 2005). Definitions of EI under this approach are broad and disparate, including 'an array of noncognitive capabilities, competencies, and skills that influence one's ability to succeed in coping with environmental demands and pressures' (Bar-On, 1997, p. 14), or 'a constellation of emotional self-perceptions located at the lower levels of personality hierarchies' (Petrides, 2010, p. 137; EI is also referred to as emotional self-efficacy here). Accordingly, researchers proposed different conceptualizations of trait EI and developed accompanying self-report questionnaires (for a detailed overview see Tett et al., 2005). Although they all have some overlap, they also differ from one another, especially in terms of breadth. Petrides and Furnham (2001) conducted content-analyses of different trait EI conceptualizations and they identified a list of 15 core trait EI facets: adaptability, assertiveness, emotion appraisal in self and others, emotion expression, emotion management in others, emotion regulation, impulsiveness, relationship skill, self-esteem, self-motivation, social competence, stress management, trait empathy, trait happiness, and trait optimism. As can be seen from this list, these conceptualizations of trait EI also encompass facets that are part of ability EI, namely emotion appraisal, emotion expression, and emotion management and regulation. While these facets of EI are seen as emotional abilities in analogy to cognitive abilities under the ability framework, the focus lies on self-perceptions of emotional competencies under the personality framework. Proponents of trait EI argue that facets of EI are best assessed with self-report scales in order to account for the subjective nature of emotions and their regulation (Petrides, Pita, & Kokkinaki, 2007). Since trait EI models are not restricted to behavioral dispositions and also include emotion-related abilities, they are also referred to as 'mixed models' (Joseph & Newman, 2010; Mayer et al., 2008).

Trait EI has been investigated in relation to a number of work-related outcomes. For instance, a meta-analysis revealed a strong relationship

with transformational leadership when relying on same-source ratings but a weak relationship when relying on multi-source ratings (Harms & Credé, 2010). Meta-analyses have also documented modest relationships of trait EI with job performance (O'Boyle, Humphrey, Pollack, Hawver, & Story, 2010; Van Rooy & Viswesvaran, 2004). Not only was trait EI related to job performance, but it also displayed some incremental validity above and beyond the FFM of personality and cognitive intelligence (O'Boyle et al., 2010).

Trait conceptualizations of EI (or mixed models) have been subject to a lot of criticism, the most prominent one being the lack of agreement and focus in conceptualizations and measurement instruments (Cherniss, 2010; Daus & Ashkanasy, 2003; Mayer et al., 2008; Zeidner et al., 2008). These compound conceptualizations of EI have been described as being a 'grab bag' of a number of concepts that are only loosely connected, taking EI abilities from the four-branch model of EI (Mayer & Salovey, 1997; Salovey & Mayer, 1990) and combining them with scales measuring for instance stress tolerance, adaptability, impulsiveness, creative thinking, etc. (Joseph & Newman, 2010; Mayer et al., 2008). Another point of concern is the degree of overlap with established constructs, especially from the personality domain (Locke, 2005; Matthews et al., 2004; Roberts, MacCann, Matthews, & Zeidner, 2010). Indeed, several meta-analyses revealed that while correlations with cognitive abilities are low, relationships with FFM traits are considerable, especially with neuroticism and extraversion (O'Boyle et al., 2010; see also Joseph & Newman, 2010; Van Rooy & Viswesvaran, 2004) suggesting an over-inclusive definition of EI (Roberts et al., 2010). Indeed, a large-scale meta-analysis by van Der Linden and colleagues (2017) found that the General Factor of Personality correlated strongly with EI. Several IWO psychologists have therefore been critical of trait conceptualizations of EI and prefer to rely on the ability-based framework (Côté, 2010; Daus & Ashkanasy, 2003; Joseph & Newman, 2010).

Optimism

Research on dispositional optimism, 'the tendency to believe that one will generally experience good vs. bad outcomes in life' (Scheier & Carver, 1992, p. 203) dates back to the 1980s when it evolved at the intersection between personality and health psychology (Carver & Scheier, 2014). Carver and Scheier did important pioneer work on dispositional optimism and introduced

the first and most important self-report measure, the Life Orientation Test (Scheier, Carver, & Bridges, 1994). Their work on optimism evolved from their interest in self-regulation of behavior and was based on the notion that people's behavior is influenced by their expectations about the consequences of their actions (Scheier & Carver, 1992). They argue that optimism has cognitive, emotional, and motivational elements (Carver & Scheier, 2014): it is a cognitive construct as it refers to individuals' expectancies, it has an emotional connotation by capturing the value of these expectancies (good or bad), and it is motivational in that the expectancies drive goal-related behavior. Importantly, studying optimism as a facet of personality, the focus is on individuals' *generalized* expectancies about the future rather than specific expectancies in a particular situation (Scheier, Carver, & Bridges, 2001).

How does dispositional optimism relate to other personality traits? Meta-analytic evidence suggests a strong relationship with neuroticism and moderate relations with extraversion, agreeableness, conscientiousness, and openness (Alarcon, Bowling, & Khazon, 2013). Although there is some overlap, optimism is thus distinct enough to qualify as a unique construct. Importantly, this meta-analysis confirmed that it is distinct from neuroticism, thereby mitigating a concern that has been echoed in the literature (Scheier et al., 1994). Carver and Scheier (2014) suggested that while FFM traits describe the 'what' of human behavior in terms of social influence (extraversion), threat avoidance (neuroticism), or social ties (agreeableness), optimism refers to the 'how' in terms of how individuals turn or fail to turn their goals into actual behavior. Finding equally strong relationships with extraversion, openness, agreeableness, and conscientiousness around .30 supports this view. Notably, however, the meta-analysis revealed considerable overlap with narrower personality traits, including self-esteem, generalized self-efficacy, and resilience (Alarcon et al., 2013). Future research may therefore place special attention on differentiating or integrating these constructs conceptually. Furthermore, these findings suggest that it may be important to control for these potential confounds when studying optimism–outcome relationships.

Optimism plays an important role in the self-regulation of behavior and it has been shown to be an important predictor of goal pursuit and attainment (Geers, Wellman, & Lassiter, 2009). It should therefore also play a role in the self-regulation of behavior in the context of work. Yet, compared to empirical research in the area of health psychology (for an overview see Scheier et al., 2001), relatively little attention has been placed on optimism

in organizational psychology. Extant studies speak to the benefits of further exploring the role of optimism in organizational behavior and occupational health. For instance, optimism has been shown to be significantly related to job performance and job satisfaction (Youssef & Luthans, 2007), optimism in first-year law school students predicted annual income a decade later (Segerstrom, 2007), optimism buffered adverse effects of warzone stress on mental health symptoms as well as the effect of mental health symptoms on work impairment among combat veterans (Thomas, Britt, Odle-Dusseau, & Bliese, 2011). The positive effects of optimism on various outcomes have been ascribed to the persistence in goal pursuit and the use of adaptive coping strategies (more approach, less avoidance coping) (Carver & Scheier, 2014; Nes & Segerstrom, 2006; Thomas et al., 2011).

Mindfulness

Recently mindfulness has started to garner attention among organizational scholars (Allen & Kiburz, 2012; Glomb, Duffy, Bono, & Yang, 2011; Hülsheger, Alberts, Feinholdt, & Lang, 2013; Hülsheger, Lang, Depenbrock, Fehrmann, Zijlstra, & Alberts, 2014; Leroy, Anseel, Dimitrova, & Sels, 2013; Michel, Bosch, & Rexroth, 2014; Reb, Narayanan, & Chaturvedi, 2012). The concept of mindfulness has its roots in Buddhist philosophy and it has been defined as a state of consciousness characterized by attention and awareness of present-moment experiences without judgment (Brown & Ryan, 2003; Glomb et al., 2011). Notably, the construct of mindfulness has been studied from different perspectives. By definition, mindfulness is a state of mind, and researchers have therefore studied mindfulness as a state that varies from moment to moment, day to day (Brown & Ryan, 2003; Hülsheger et al., 2013, 2014; Weinstein, Brown, & Ryan, 2009). Yet, many researchers conceptualize mindfulness as a trait, especially in Personality Psychology. They focus on individuals' general dispositions to be aware of internal and external experiences and to attend to them with a non-judgmental attitude (Brown, Ryan, & Creswell, 2007; Glomb et al., 2011; Weinstein et al., 2009). An important feature of mindfulness is that it involves experiential processing of situations and events (Good et al., 2016). Typically, individuals engage in conceptual processing where thoughts dominate attention and events are habitually evaluated and interpreted with reference to the self. In contrast, with experiential processing one pays attention to stimuli themselves without trying to evaluate what one experiences or create a mental

story about what is (Good et al., 2016). Mindful-experiential processing of events thereby facilitates adaptive appraisals of workplace situations and demands (Good et al., 2016).

Trait mindfulness is typically assessed with self-report scales. While a number of different scales exist (for an overview see Bergomi, Tschacher, & Kupper, 2012), researchers who wish to assess trait mindfulness in participants without experience with (mindfulness) meditation, typically use the Mindfulness Attention and Awareness Scale (MAAS; Brown & Ryan, 2003). One of the reasons may be that items refer to everyday experiences without relying on language that is only intelligible to individuals who have experience with meditation. Notably, the MAAS assesses the absence of mindfulness such as the tendency to run on automatic pilot, to do things without paying attention, to frequently think about the past or the future, and to be unaware of one's emotions (for a criticism of this approach see Grossman, 2011). When a new construct is introduced, the question typically arises whether it is distinct enough from established constructs to have a scientific right to exist. Research into the convergent and discriminant validity of trait mindfulness has revealed strong relations with neuroticism ($\rho = -.58$), moderate relations with conscientiousness, agreeableness, trait EI, self-esteem and optimism, and weak relations with openness (Brown & Ryan, 2003; Giluk, 2009). The strong negative association between neuroticism and mindfulness may be a point of concern as it may suggest a lack of discriminant validity. Yet, studies controlling for neuroticism when using trait mindfulness as a predictor of depressive symptoms, anger, coping styles, or perceived stress revealed that mindfulness incrementally predicts outcome variables above and beyond Neuroticism (Barnhofer, Duggan, & Griffith, 2011; Feltman, Robinson, & Ode, 2009; Weinstein et al., 2009).

Recently, researchers have delineated how mindfulness facilitates self-regulation of thoughts, emotions, and behavior and how it may thereby benefit a host of work-related outcomes, including employee health and well-being, social relations at work, decision making, and task and contextual performance (Glomb et al., 2011; Good et al., 2016). Some of these relationships have already received empirical support in the literature. For instance, trait mindfulness has been found to be positively associated with task performance (Dane & Brummel, 2014; Reb, Narayanan, & Ho, 2013), recovery from work (Hülshager et al., 2014), job satisfaction (Hülshager et al., 2013; Reb et al., 2013), organizational citizenship behavior (Reb et al., 2013), work-family balance (Allen & Kiburz, 2012) and negatively with the core

burnout dimension emotional exhaustion (Hülshager et al., 2013).

WORKPLACE IMPACT: THEORETICAL MODELS AND EMPIRICAL FINDINGS

Job Performance

The literature on personality and job performance is vast. Several dozen meta-analytic publications have documented the validity of personality variables in relation to job performance constructs. Rather than treading well-worn ground of which traits predict job performance and its major facets, we describe noteworthy theories that provide insight into the personality-behavior interface in work settings. In the section on criterion-related validity below, we highlight findings and trends from meta-analyses.

Theory of Purposeful Work Behavior

Recently, Barrick, Mount, and Li (2013) presented the Theory of Purposeful Work Behavior (TPWB) to describe why and under what conditions personality traits relate to performance and satisfaction. At its core, TPWB focuses on the processes of purposefulness (the process through which individual characteristics develop into directed action) and meaningfulness (the perception that those actions are of value) to link personality to work behaviors and attitudes. Similar to CB5T's focus on cybernetic goal pursuit and socioanalytic theory's focus on agendas, TPWB argues that higher-order, implicit goals are the central mediating mechanisms in these processes. Drawing on multiple theoretical frameworks of motivation, (e.g., McClelland's theory of needs, McClelland, 1971; self-determination theory; Ryan & Deci, 2000), Barrick et al. (2013) identify four core higher-order goals that individuals differ on, each tied to particular Big Five traits: communion striving (the motivation to get along harmoniously with others, tied to agreeableness and emotional stability), status striving (the motivation to seek power, tied to extraversion), autonomy striving (encompassing both the motivation to control aspects of one's work environment and to pursue personal growth, tied to openness and extraversion), and achievement striving (the motivation toward a sense of accomplishment, tied to conscientiousness and emotional stability). According to TPWB, personality traits give rise to these implicit goals, which in turn direct

individuals in the careers they choose and how goals are prioritized in the goal hierarchy. Finding a close fit of these implicit goals and task/social characteristic of the job produces the experience that a person's work is meaningful.

Particularly notable about the TPWB is that it posits a series of specific, testable propositions based on this understanding. For instance, Barrick et al. (2013) hypothesize (a) that achievement striving mediates the relationship between conscientiousness and job performance, (b) that conscientious individuals will seek out jobs high in task identity, feedback from the job, and feedback from others in service of this achievement striving motive, and (c) that task identity, feedback from the job, and feedback from others will strengthen (moderate) the relationship between achievement striving and meaningfulness. From this perspective, individuals' personalities manifest in the careers and work environments they choose, in the motivations they adopt, and in the dynamic way in which they respond to task and social characteristics of the job. Predictions such as these recast the way that we think of workplace situations from one in which employees are casualties of their workplace environment to one where individuals agentically seek out and adjust to their work environment based on their personality.

Trait Activation Theory

One of the most influential contemporary personality theories in Industrial, Work, and Organizational Psychology has been Trait Activation Theory (TAT; Tett & Burnett, 2003; Tett & Guterman, 2000). TAT begins with the premise that the relevance (and associated validity) of a personality trait for predicting a given behavior depends on features of the situation. This premise is not particularly new in personality: the earliest personality psychologists articulated notions about situational relevance for traits (e.g., Allport, 1937; Murray, 1938), and person–situation interactionism has been a recurrent notion throughout the history of personality research (e.g., Buss, 1989; Cronbach, 1957; Funder, 1995; Griffo & Colvin, 2009). However, TAT makes important contributions in laying a framework for considering aspects of situations in the workplace that could be important trait moderators. Specifically, TAT delineates that jobs vary in both the sources of situational cues (from the organization, the social environment, and from the task itself) and from the effects those cues have on trait expression (as demands, distracters, constraints, or releasers).

A considerable body of empirical research has drawn on TAT when examining situational moderators of personality traits, both in primary studies and in meta-analyses. For example, Kamdar and Van Dyne (2007) found that Conscientiousness and Agreeableness were stronger predictors of task performance and helping behaviors among poorer quality social exchange relationships than among higher quality relationships (where reciprocity norms limit personality expression). As a meta-analytic example, Judge and Zapata (2015) found that openness was a stronger predictor of performance in jobs requiring creativity and agreeableness was a stronger predictor of performance in jobs requiring dealing with angry people. Indeed, TAT has been invoked across a wide range of research to add complexity in understanding personality's relationships with task performance, contextual performance, counterproductive work behaviors, fit, and withdrawal behaviors (Tett, Simonet, Walser, & Brown, 2013).

The greatest challenge for TAT research has been in identifying which features of situations are most crucial for determining the relationship between a given trait and a given criterion. To their credit, for each of the Big Five, Tett and Burnett (2003) articulate a very extensive listing of potentially relevant situational demands, distracters, constraints, and releasers from task, social, and organizational sources. However, isolating and quantifying the unique effects of all of these fine-grained situational factors represents a daunting task for anyone attempting to hypothesize about which contexts will achieve the strongest and weakest validities for a given trait–criterion relationship. Much of this difficulty likely stems from a relative dearth of taxonomies of 'situations' that might parallel existing taxonomies of personality (e.g., the Big Five) or of performance criteria (e.g., Campbell, McCloy, Oppler, & Sager, 1993). Recent attempts at general situational taxonomies (e.g., Rauthmann et al., 2014) may offer researchers drawing on TAT clearer integration when developing hypotheses about situational moderators and when synthesizing the results of extant TAT research, particularly if unique situational taxonomies could be developed for workplace contexts. Such a situational taxonomy could provide further guidance about how job analysis information could be developed and used to capitalize on personality traits' predictive power.

Despite these challenges, TAT holds several important implications for personality theory and practice in IWO psychology. First, although IWO psychologists tend to focus on meta-analytic mean correlations for appraising predictive validities, TAT reminds us that validities can vary in meaningful ways by situation (Tett & Christiansen,

2007). Accordingly, a combination of large-scale, integrative research on specific situational moderators of validities and accompanying job analytic methods offer organizations mechanisms for contemplating and capitalizing on any such situational variation. Second, TAT offers a framework for thinking about how assessment situations (e.g., interviews, assessment centers, and work samples) can be designed to be relevant for eliciting particular personality traits (or individual differences more broadly; Lievens, Chasteen, Day, & Christiansen, 2006). Finally, if personality manifests somewhat differently across different contexts (e.g., characteristic adaptations), researchers and practitioners could potentially build more nuance into assessments by directing respondents to consider personality within a particular context (Shaffer & Postlethwaite, 2012) or choosing respondents familiar with the target in a particular context (Geeza, Connelly, & Chang, 2010).

Socioanalytic Theory

Socioanalytic theory offers an alternate perspective on how personality should be defined and how personality guides behavior in the workplace. First, socioanalytic theory posits that all people share three universal needs: being socially accepted (getting along), gaining status, power, and control of resources (getting ahead), and understanding and predicting the structure of the world around us (finding meaning; R. Hogan & Chamorro-Premuzic, 2015). In particular, these three needs serve evolutionary functions to help individuals and the groups to which they belong to survive, reproduce, and propagate their genes. However, people differ in how they understand, prioritize, and pursue these needs; these differences form the basis of personality.

Socioanalytic theory posits that these differences that constitute personality can be separated into two components. On one hand, personality can be studied and defined from the perspective of social actors pursuing goals and agendas, through which they create a reputation. Socioanalytic theory posits that traits as typically studied fit well within a reputation framework for understanding personality – that is, traits are not necessarily intra-psychic mechanisms that produce behavior so much as simple descriptors used to characterize accumulated interpersonal interactions. In contrast, personality can be studied and defined from the perspective of individuals building understanding of themselves, through which they form an identity. Whereas a person's reputation is largely a descriptive byproduct of social interactions,

identity wades into a person's explanatory mechanisms for why they think, feel, and behave the way they do. In contrast to the relative ease with which the reputation component of personality can be measured, Hogan and colleagues (e.g., Hogan & Bickel, 2013; Hogan & Shelton, 1998) argue that identity is far more difficult to assess accurately and comprehensively. Hogan and colleagues align Holland's (1985) values scales as successful assessment of one element of values; McAdams' (2008) method of assessing personality via personal narratives could be an additional approach for soliciting elements of identity.

Socioanalytic theory makes several important contributions for how IWO psychologists conceptualize personality's influence in the workplace. First, socioanalytic theory's bifurcation of personality into reputation and identity components can confront researchers to specify which component of personality might be most relevant for the criterion at hand. For example, Hogan and Bickel (2013) argued that reputation is most relevant for performance because reputation tacitly involves evaluations of a person's worth and contribution (as does performance). In contrast, researchers studying how personality guides individuals to feel satisfied and fulfilled at work (outcomes held internal to the actor) may benefit more from conceptualizing personality from the perspective of identity.

Second, in emphasizing personality as reputation, socioanalytic theory places front-and-center impression management practices that facilitate achieving a person's goals and agendas. Historically, impression management has been construed as a fiendish motive that impugns researchers' ability to corral research participants as accomplices in accurately assessing internal, neuropsychic trait structures. By contrast, in socioanalytic theory, the impressions and reputations that individuals create *are* personality (or at least one component of it), and assessing how a person creates a reputation in one context (e.g., a personality measure) has value because it models how a person is likely to create a reputation in other contexts (e.g., interacting with a supervisor). Thus, personality is not always passively, internally held but rather actively created and communicated through behavior.

Third, socioanalytic theory's three needs (getting along, getting ahead, and finding meaning) provides a useful framework for sorting many of the performance and attitudinal criteria that IWO psychologists study in a way that readily aligns with personality traits. In particular, J. Hogan and Holland (2003) found that separating performance criteria into getting ahead and getting along criteria produced stronger and more nuanced patterns of criterion-related validity coefficients for

personality traits. On the whole, socioanalytic theory offers a useful and alternate framework that can stimulate new questions and new interpretations in IWO personality research.

Personality and Learning

Job knowledge is a key determinant of individual performance at work (McCloy, Campbell, & Cudeck, 1994; Schmidt, Hunter, & Outerbridge, 1986). Are personality characteristics relevant for acquisition of knowledge in general and for acquisition of job knowledge in particular? The literature on personality and academic performance addresses the first question, whereas the literature on personality and training addresses the second. We discuss each in turn.

Academic study prepares individuals for employment and careers in general. A substantial body of research, including meta-analyses, have confirmed that conscientiousness (McAbee & Oswald, 2013; Poropat, 2009) and particularly its Achievement facet (Hough, 1992; Robbins, Lauver, Le, Davis, Langley, & Carlstrom, 2004) are predictive of GPA ($p = .23-.31$). Findings for other ratings of conscientiousness are similarly positive, but stronger (Connelly & Ones, 2010). Persistent, motivated effort associated with conscientiousness explains the motivationally directive effect of conscientiousness. Findings for openness are complex. Openness appears to correlate with academic performance (GPA) in the .07–.17 range (Hough, 1992; McAbee & Oswald, 2013; Poropat, 2009). Yet, the relation between typical intellectual engagement, a marker for the curiosity facet of openness, may be even stronger ($p = .33$ based on $N = 608$, $k = 4$; von Stumm, Hell, & Chamorro-Premuzic, 2014). It is likely that curiosity, a general tendency to engage with intellectual material encountered in learning environments leads to greater repeated exposure to knowledge and engagement with it, resulting in better academic performance. Findings for Extraversion are conflicting. Although some meta-analyses report negligibly small, negative relations (McAbee & Oswald, 2013; Poropat, 2009), others report small positive (Hough, 1992) and large positive relations (Connelly & Ones, 2010, for other-ratings of Extraversion). Examination of extraversion aspects and facets alongside academic majors involved can help sort out these discrepancies. Relations for agreeableness are negligible and for neuroticism consistently negative, but small.

Turning to training environments in organizational settings, two meta-analyses have found that three of the Big Five personality domains

are related to training performance: openness ($p = .33$), extraversion ($p = .28$), and Conscientiousness ($p = .28$) (Barrick et al., 2001). Relatedly, integrity tests have also been found to relate to training success (Ones, Viswesvaran, & Schmidt, 2012). Openness is the characteristic underlying curiosity, imagination, and having broad interests. Extraversion is the characteristic that underlies behavioral engagement and in training contexts manifests itself as active participation during training, asking questions and so forth. Conscientious employees are likely to see the career benefits of training and approach acquisition of job knowledge with persistence and determination.

Occupation-specific training effects have also been reported based on job-focused meta-analyses. For example, neuroticism has detrimental effects on training performance in military jobs in general (Darr, 2011) and for military pilots in particular (Campbell, Castenda, & Pulos, 2009), where stress management may be particularly crucial. For these jobs, extraversion appears to be uncorrelated with training performance, but conscientiousness validities are consistently positive and notable. For police officers, apart from the positive effects for conscientiousness and its facets, low neuroticism, particularly anxiety, and high openness, particularly intellect and tolerance, appear to play a role in successful training performance (Ones, Viswesvaran, Cullen, Drees, & Langkamp, 2003; Ones, Viswesvaran, & Dilchert, 2004).

In examining the role of personality variables in training, an understanding of training criteria is helpful. Various training attitudes, behaviors, and outcomes are differentially related to personality variables, implying unique personality processes underlie each particular training criterion. The initial evidence for this came from a small-scale meta-analysis that examined a limited set of personality variables (conscientiousness, achievement, anxiety, and locus of control) in relation to trainee reactions, motivation to learn, declarative knowledge, skill acquisition, and transfer (Colquitt, LePine, & Noe, 2000). Although no firm conclusions can be made based on this study due to small k s and small overall N s, some findings and conceptual bases for the relationships offered were tantalizing. Subsequent research has started to hone in on the role of personality traits for specific training behaviors and outcomes.

Focusing on motivation to transfer, a recent meta-analysis confirmed the strong role that conscientiousness plays in motivation to transfer. Conscientiousness is substantially related to motivation to transfer training (meta-analytic $p = .26$; Huang, Blume, Ford, & Baldwin, 2015). But its effects appear to differ for maximal and typical transfer. Maximal transfer involves trainees

being provided explicit and implicit tools (e.g., prompts) to maximize effort for typically a short duration during transfer, whereas typical transfer is longer term and does not rely on explicit or implicit prompts or inducements. The former reduces motivational differences among individuals. Consequently, conscientiousness is a notable, positive predictor of typical transfer, but not maximal transfer ($\rho = .22$ and $-.02$, respectively; Huang et al., 2015). Thus, individuals' conscientiousness appear to function as the internal voice that persistently prompts, reminds, and reinforces them to use what has been learned in training on the job, day in and day out. Future research on personality and training relationships can benefit from better differentiation among training criteria, as well as content and method of training. For example, questions such as which personality attributes are helpful in social skills training using games versus using coaching await study. Substantial bodies of primary research will be needed.

Personality and Leadership

Personality and leadership has been a prominent topic of interest for almost 100 years with substantial research attention and controversy (Murphy & Murphy, 1935; Parten, 1933; Murchison, 1935; Bass, 1990; Yukl, 1990). After falling out of favor as determinants of leadership-related constructs, personality attributes have made a comeback. In discussing how personality relates to leadership, a careful attention to what is meant by the 'leadership' criterion is essential. The role of personality has been examined in relation to leadership emergence, role occupancy, performance, effectiveness, as well as particular leadership styles (e.g., transformational leadership). Here we provide a high level overview, as a detailed treatment would require multiple volumes.

Leadership emergence refers to being perceived as leader-like by others. Meta-analyses indicate that individuals who are emotionally stable, extraverted, open, and conscientious are more likely to be perceived as leader-like. Unreliability corrected correlations are in the .24–.33 range (Judge, Bono, Ilies, & Gerhardt, 2002). Practically, in organizational settings, occupying leadership roles includes serving in various managerial roles. Ones and Dilchert (2009) reported personality differences between managers and the general population norms. Even lowest level supervisors are markedly more emotionally stable, extraverted and stable than the average individual. The standardized mean difference was larger than 1 for Emotional Stability and larger than .50 for

extraversion and agreeableness. Top executives' standing on all Big Five personality attributes are higher than lower-level managers. Differences are largest for extraversion and openness, where executives score about .60 SD (standard deviation) units higher than lowest level managers. The corresponding difference is about .50 SD units for openness.

Leadership performance is defined as 'behaviors directed at influencing the performance of subordinates through ... interpersonal interaction and influence' (Campbell, 1994, p. 197). Campbell (2013) synthesized six leadership performance factors: (1) consideration and support, (2) initiating structure, guiding, and directing, (3) goal emphasis, (4) empowerment/facilitation, (5) training, coaching, and (6) serving as a model. Overall effective performance refers to a leader's performance of these behaviors so as to effectively influence his or her subordinates. Based on their meta-analytic evidence, Judge et al. (2002) reported that individuals who are emotionally stable, extraverted, open, agreeable, and conscientious tend to be more effective as leaders (ρ in .20s for all but conscientiousness, for which ρ was .16).

Leadership derailment describes leadership failures in organizations. Bentz' (1967, 1990) 30-year longitudinal research at Sears led to the conclusion that intelligent and skilled managers could and often did fail due to 'overriding personality defects'. Research in the 1990s turned to dark side personality measures to explain derailment, above and beyond normal personality measures (e.g., Arneson, Millikin-Davies, & Hogan, 1993; R. Hogan & Hogan, 2001; R. Hogan, Raskin, & Fazzini, 1990; Moscoso and Salgado, 2004). A measure-based meta-analysis (of the Hogan Development Survey) revealed that managerial performance was negatively related to being laid back and indifferent (Leisurely, $\rho = -.20$), moody and inconsistent (Excitable, $\rho = -.16$), resistant to change (Cautious, $\rho = -.16$), cynical and distrustful (Skeptical, $\rho = -.14$), and socially withdrawn (Reserved, $\rho = -.11$). Taken together, these personality attributes interfere with the performance of leaders in building, supporting, and managing their teams.

It has been argued that leadership effectiveness should be measured in terms of team, group, or organizational effectiveness (Hogan, Curphy, & Hogan, 1994). Moving to organizational levels of analysis, organizational leaders appear to make a difference in firm performance (Hogan & Judge, 2013). The personalities of CEOs in organizations have been linked to organizational strategic choices, firm policies, and performance (Chatterjee & Hambrick, 2007; Gow, Kaplan, Larcker, & Zakolyukina, 2016; Nadkarni & Herrmann, 2010). CEO openness is positively associated with R&D

Density, but negatively with net leverage. Higher levels of CEO openness likely helps cultures of innovation thrive in organizations, but may expose organizations to greater business risk (lower leverage). CEO conscientiousness is positively related to book-to-market ratio (i.e., low growth) likely due to excessive caution exercised by the CEO and his/her team. CEO extraversion appears to be negatively related to Return on Assets (ROA) and cash flow. Although extraversion may be beneficial in rising to leadership positions (i.e., is related to leadership emergence, role occupancy, but to a lesser extent to leadership performance behaviors), it may be that in large contemporary organizations, CEO extraversion may be associated with dysfunctional decision making where one perspective (the CEOs) dominates discourse and decisions. In a similar vein, CEO narcissism, which includes maladaptive extraversion, creates variability in organizational performance with no overall superior performance benefits (Wales, Patel, & Lumpkin, 2013).

Attitudes and Commitment

Affective job attitudes, such as job satisfaction and affective organizational commitment, are among the most widely studied outcome variables in research on organizational behavior. The popularity may, in part, be ascribed to their relationship with job performance (Judge, Thoresen, Bono, & Patton, 2001; Riketta, 2002, 2008). Closely related are also turnover intentions and actual turnover which have been shown to be proximal outcomes of job attitudes (Tett & Meyer, 1993). In trying to answer why some employees are more satisfied with their jobs, more committed to their organization, and think less about leaving the organization than others, not only aspects of the job itself and working conditions but also employees' personality dispositions have been shown to play an important role.

In fact, research has documented that individuals have trait-like tendencies to be more or less satisfied with their jobs. Evidence for the dispositional nature of job satisfaction stems from various streams of research. First, job satisfaction seems to remain fairly stable even over longer periods of time (Staw & Ross, 1985). Indeed, a meta-analysis documented substantial test-retest correlations between measures of job satisfaction ($\rho = .50$; average time-lag 36 months; Dormann & Zapf, 2001). Notably, test-retest correlations were still substantial ($\rho = .35$) even when considering only individuals who changed jobs (Dormann & Zapf, 2001). Although these findings provide a first indication

of the dispositional nature of job satisfaction, situational explanations for job satisfaction cannot be ruled out, as those individuals who are able to acquire a high-quality job once are likely to be able to acquire a similar job at a later point in time. As a consequence, the stability of job satisfaction may not only be explained by the dispositional nature of job attitudes, but also by the relative consistency in jobs (Judge & Klinger, 2010). Second, job satisfaction seems to have a substantial genetic component. Research with monozygotic twins reared apart has suggested that about 30% of variance in job satisfaction can be explained by genetic factors (Arvey, Bouchard, Segal, & Abraham, 1989). A follow-up analysis scrutinizing the mechanisms that drive the genetic basis of job satisfaction revealed that FFM traits accounted for about 24% of the genetic variance in job satisfaction while trait positive and negative affectivity mediated about 45% of the effect (Ilies & Judge, 2003). Third, longitudinal studies have shown that personality variables such as Conscientiousness and affective dispositions assessed during childhood predict later job satisfaction (Judge, Higgins, Thoresen, & Barrick, 1999; Staw, Bell, & Clausen, 1986). Fourth and finally, evidence stems from studies that have directly investigated the link of personality characteristics with job satisfaction. Two meta-analyses (Connolly & Viswesvaran, 2000; Thoresen, Kaplan, Barsky, Warren, & de Chermon, 2003) revealed moderate relationships with trait positive ($\rho = .49$; $\rho = .33$, respectively) and negative affect ($\rho = -.33$, $\rho = -.37$, respectively) and with CSEs ($\rho = .37$; Judge & Bono, 2001). Somewhat lower, but still meaningful associations were documented for neuroticism ($\rho = -.29$), conscientiousness ($\rho = .26$), and extraversion ($\rho = .25$) (Judge, Heller, & Mount, 2002; lower correlations were found by Bruk-Lee, Khoury, Nixon, Goh, & Spector, 2009).

How can the relationships between affective dispositions, FFM traits, CSEs, and job satisfaction be explained? Trait positive and negative affect describes individuals' dispositions to experience positive vs. negative emotions. Individuals high in trait positive affect are predisposed to experience more positive emotions and they tend to perceive and interpret their surroundings in a favorable light. In contrast, individuals high in trait negative affect are predisposed to experience more negative emotions and they tend to perceive their environment more negatively (Connolly & Viswesvaran, 2000; Judge et al., 2002). As affective experiences at work shape employees' overall evaluation of their job in terms of job satisfaction (Weiss & Cropanzano, 1996), individuals high in trait positive affect are therefore likely

to experience and report higher job satisfaction while individuals high in trait negative affect are predisposed to have lower levels of job satisfaction. Similar explanations have been put forth for the link of neuroticism and extraversion with job satisfaction (Judge et al., 2002): Similar to individuals high on trait negative affect, individuals high in neuroticism experience their environment more negatively. Moreover, they tend to end up in unfavorable life situations that foster negative affect. This tendency extends to work situations and should therefore negatively affect their job satisfaction. In contrast, individuals high in extraversion perceive their environment more favorably, just like individuals high on trait positive affect. In addition, due to their tendency to be outgoing, sociable, and active, they are more likely to experience pleasurable social interactions at work than introverts which, in turn, may positively affect their job satisfaction. Individuals high on conscientiousness tend to be self-disciplined, forward planning, achievement striving and tend to work hard. Due to these characteristics they are likely to perform well on their job and achieve satisfying formal and informal work rewards including pay, promotions, but also respect and recognition (Judge et al., 2002).

Similar to affect, neuroticism, and extraversion, the positive link between CSEs and job satisfaction may, in part, be explained by individual differences in how employees perceive their work environment. Individuals high in CSEs have been ascribed better appraisal mechanisms and they may therefore be less likely to perceive work events and their work environment as stressful (Judge, Hulin, & Dalal, 2012). However, they do not only have a more favorable view of their work. Research has also pointed to more indirect mechanisms that drive the core self-evaluations–job satisfaction relationship: Individuals high on CSEs tend to end up in jobs with more positive job characteristics, such as more job complexity (Judge, Bono, & Locke, 2000) and they tend to choose more meaningful work goals, i.e., work goals that are in accordance with their values and that they pursue for intrinsic reasons (Judge, Bono, Erez, & Locke, 2005).

Although less intensively studied, research also suggests that affective organizational commitment, turnover intentions, and actual turnover are influenced by personality traits. Similar to job satisfaction, organizational commitment has been shown to be relatively stable over time (Maier & Woschée, 2007). Furthermore, a large-scale study comparing monozygotic and dizygotic twins estimated that 36% of individual differences in the frequency of changing jobs can be accounted for by genetic differences (McCall, Cavanaugh, & Arvey, 1997). In addition, research has directly studied

the relationship of personality traits with organizational commitment and turnover. Regarding organizational commitment, significant relationships have been documented for extraversion ($r = .20$; Erdheim, Wang, & Zickar, 2006), trait positive affect ($r = .55$), and trait negative affect ($r = -.27$; Cropanzano, Keith, & Konovsky, 1993). Similar to the explanations provided for the link of affect, neuroticism, and extraversion with job satisfaction, the relationships of affect and extraversion with affective organizational commitment may be explained by differences in propensities to generally experience more positive and less negative emotions and to perceive the work environment in a favorable or unfavorable light (Erdheim et al., 2006). As documented by Zimmerman (2008), turnover is significantly associated with agreeableness ($\rho = -.25$), conscientiousness ($\rho = -.20$), and Emotional Stability ($\rho = -.18$). A meta-analytic path model revealed that these personality traits both had direct effects on intentions to quit and turnover as well as indirect effects through job satisfaction and job performance.

Personality and Health, Stress, and Burnout

While the majority of research on the role of personality at work has focused on performance-related outcomes or job attitudes, evidence has also accumulated on the role of personality for occupational stress and health. To the extent that personality influences what kind of situations we seek out, what responses we elicit from others, how we interpret our surroundings, and how we tend to cope with challenges (Friedman & Kern, 2014), it is likely that personality characteristics play a role in workplace stress and well-being.

Indeed, meta-analytic evidence suggests that personality characteristics are related to the burnout dimensions of emotional exhaustion, depersonalization, and personal accomplishment: Among FFM traits, a meta-analysis documented strongest relationships for neuroticism (emotional exhaustion: $\rho = .52$; depersonalization: $\rho = .42$; personal accomplishment: $\rho = -.38$) and extraversion (emotional exhaustion: $\rho = .29$; depersonalization: $\rho = .23$; personal accomplishment: $\rho = -.41$; Swider & Zimmerman, 2010). Furthermore, aspects of burnout are related to trait positive affect (emotional exhaustion: $\rho = -.42$; depersonalization: $\rho = -.42$; personal accomplishment: $\rho = .50$) and trait negative affect (emotional exhaustion: $\rho = .49$; depersonalization: $\rho = .43$; personal accomplishment: $\rho = -.22$; Alarcon, Eschleman, & Bowling, 2009). Parallel findings for neuroticism and trait

negative affect as well as extraversion and trait positive affect are not surprising considering that neuroticism and trait negative affect, extraversion and trait positive affect bear important similarities (Watson & Clark, 1997). Relationships with burnout dimensions may be explained through a direct and an indirect pathway. Individuals high on neuroticism and trait negative affect tend to experience negative emotions, focus on negative events, appraise situations negatively, and recall negative information (Swider & Zimmerman, 2010; Thoresen et al., 2003). In contrast, individuals high on extraversion and positive affect tend to experience positive emotions, including cheerfulness, enthusiasm, and optimism. They have a brighter outlook on their work itself, on work circumstances and they are more optimistic about their ability to cope with demands and stress (Swider & Zimmerman, 2010). In addition to this direct pathway, there may be indirect effects, as individuals high on neuroticism/trait negative affect are more likely to be confronted with conflicts at work and encounter job stressors as role ambiguity, role conflict, or negative work events (Thoresen et al., 2003). In contrast, the optimism, cheerfulness, and energy of individuals high on extraversion/trait positive affect may promote pleasurable social relationships at work that help them to cope with daily hassles at work.

Similarly, CSEs have been shown to be negatively related to work-related strain ($\rho = -.42$; C.-H. Chang et al., 2012). The negative relationship may be explained by the tendency of individuals high on CSEs to appraise challenging work situations in a positive way, to be confident about their capability to handle demands effectively, and by adaptive coping mechanisms (Best, Stapleton, & Downey, 2005; C.-H. Chang et al., 2012; Kammeyer-Mueller, Judge, & Scott, 2009).

In addition to these studies into direct relationships between personality and occupational stress and health, researchers have considered personality traits as moderators of stressor-strain relationships. For instance, extraversion seems to buffer the negative effects of the emotional labor strategy of surface acting. While surface acting was associated with higher negative affect and more emotional exhaustion for introverts, it was associated with lower negative affect and lower emotional exhaustion for extraverts (Judge, Woolf, & Hurst, 2009). Similarly, the job demands-strain relationship has been shown to be buffered by CSEs. Specifically, the relationship of emotional job demands, work load, and shift work with strain reactions was considerably stronger for individuals with low CSEs than for individuals with high CSEs (van Doorn & Hülshager, 2014). Furthermore, research documented that agreeableness moderates the relationship between conflict

episodes at work and negative affect such that conflict was more strongly related to negative affect for highly agreeable individuals compared to individuals low on Agreeableness (Ilies, Johnson, Judge, & Keeney, 2010).

Personality and Career Success

Why do some people thrive, receive promotions, ascend to high managerial position, and are satisfied with their careers while others are not? Apart from human capital attributes (work experience, educational level, training) and demographic variables (age, gender, number of children), researchers have acknowledged the role of interindividual personality differences in career success (e.g., Boudreau, Boswell, & Judge, 2001; Dilchert & Ones, 2008; Judge et al., 1999; Seibert et al., 1999; Seibert & Kraimer, 2001; Stumpp, Muck, Hülshager, Judge, & Maier, 2010). Typically, two components of career success are considered. While extrinsic (also called objective) career success refers to tangible outcomes such as number of promotions, salary level, and occupational status, intrinsic (also called subjective) career success refers to an individual's subjective evaluations of their career-related success in terms of career or job satisfaction (Judge & Kammeyer-Mueller, 2007; Ng, Eby, Sorensen, & Feldman, 2005).

In explaining why and how dispositional traits may influence extrinsic and intrinsic career success Ng and colleagues (2005) took a mobility perspective. The contest-mobility perspective suggests that getting ahead in organizations is dependent on the extent to which individuals display high job performance and add value to the organization. In making these contributions, individuals compete with each other and those with the highest accomplishments will advance. In contrast, the sponsored-mobility perspective suggests that decision makers and established elites identify individuals who are assumed to have the highest potential and then promote them by providing sponsoring activities. The personality-career success link can be explained by both models and it is likely that personality characteristics are related to career success because they not only have an influence on who makes important accomplishments at work and advances based on merit, but also on who receives sponsorship and is promoted because of more political reasons (Ng et al., 2005). For instance, neuroticism may relate negatively to career success because of its negative link with job performance (Barrick et al., 2001), but also because being emotionally unstable and anxious reduces the likelihood of receiving

sponsorship and mentoring in organizations (Ng et al., 2005). Conscientious individuals tend to display higher job performance than their low conscientious counterparts (Barrick et al., 2001) and they may therefore have better chances of getting ahead than competitors. Yet, in addition, conscientious individuals may attract sponsorship from important decision makers because they are dutiful, achievement striving, and responsible (Ng et al., 2005). Similarly, extraversion is related to job performance, especially in jobs that involve social interaction. Furthermore, extraverts may attract more mentoring and sponsorship than introverts because they are outgoing, energetic, and assertive which helps them to build up networks and achieve visibility in organizations (Ng et al., 2005). Similar lines of arguments apply to individuals with high CSEs, who tend to show higher levels of job performance than individuals with low CSEs (Bono & Judge, 2003; C.-H. Chang et al., 2012). In addition, those higher in CSEs have a positive view on their environment, they display high levels of motivation and have confidence in their abilities (Judge & Kammeyer-Mueller, 2007). These attributes may help them to attract sponsorship and contribute to attaining high levels of career success (Stumpp et al., 2010).

Ng and colleagues' meta-analysis into the link between stable interindividual differences and career success supported this line of argumentation. Strongest relationships with career success were documented for neuroticism, extraversion, and proactivity (see also Fuller & Marler, 2009). However, overall, relationships with indicators of extrinsic career success were small in size (salary–neuroticism: $\rho = -.12$, extraversion: $\rho = .10$; proactivity: $\rho = .11$; promotion–neuroticism: $\rho = -.11$, extraversion: $\rho = .18$, proactivity: $\rho = .16$), while they were moderate with intrinsic career success (career satisfaction–neuroticism: $\rho = -.36$, extraversion: $\rho = .27$, proactivity: $\rho = .38$).

ORGANIZATIONAL APPLICATIONS

Applications in Selection

Criterion-related validity

In organizations, personality measures see widespread use in screening, selection, and talent management. Starting with early meta-analyses of personality's criterion-related validities, a substantial body of literature has accumulated documenting criterion-related validities for job performance constructs (see Barrick et al., 2001 for a summary).

Rather than comprehensively describing findings from these and subsequent meta-analyses, we highlight major trends and conclusions.

- Conscientiousness is the Big Five dimension for which the findings are most consistent across meta-analyses and criteria examined. However, order and cautiousness facets of Conscientiousness display lower criterion-related validities for overall job performance and its facets (Dudley et al., 2006).
- When the criterion is overall, task, or contextual performance, facets and aspects of Conscientiousness do not increment the criterion-related validity of the global factor (Judge, Rodell, Klinger, Simon, & Crawford, 2013; Ones & Viswesvaran, 1996).
- Facets of Extraversion and Openness appear to have substantial incremental validity over their global factors in predicting overall job performance and contextual performance, but more modest incremental validity in predicting task performance (Judge et al., 2013). Agreeableness facets show similarly substantial incremental validity for task and contextual performance (Judge et al., 2013). Neuroticism facets are more predictive of overall, task, and contextual performance than the global factor (Judge et al., 2013).
- There is strong evidence that criterion-related validities for dimensions other than the Big Five vary by occupation. Two streams of research support this conclusion. First, occupation-specific meta-analyses reveal a richer set of personality variables (i.e., facets, compound traits) predicting performance and related criteria. Such meta-analyses have been reported for sales jobs (Vinchur, Schippmann, Switzer, & Roth, 1998), managerial jobs (Hough, Ones, & Viswesvaran, 1998), law enforcement jobs (Ones et al., 2003; Spilberg & Corey, 2017), and military jobs (Drasgow, Stark, Cheryneshenko, Nye, Hulin, & White, 2012), among others. Second, an examination of occupationally homogeneous criterion-related validity studies found that all the Big Five dimensions of personality predicted performance in jobs where work represented weak situations (employees had decision-making discretion, work was unstructured, etc.), but specific traits activated by occupational job contexts were better predictors for those contexts (Judge & Zapata, 2015). Examples included stronger criterion-related validities of openness for jobs with innovation requirements, of extraversion for jobs

with social skills requirements, among others (Judge & Zapata, 2015).

- Validities for Big Five dimensions other than conscientiousness vary by criterion examined (Bartram, 2005). For example, consider Big Five relations with four different criteria: organizational citizenship behaviors (OCB), counterproductive work behaviors (CWB), turnover, and adaptive performance. All the Big Five dimensions of Big Five are related to OCB, but Extraversion appears to be a poorer predictor of organizationally directed OCB than other Big Five dimensions (Chiaburu, Oh, Berry, Li, & Gardner, 2011). Conscientiousness, Agreeableness, and emotional stability predict CWB, but agreeableness is a stronger predictor of interpersonally directed CWB, whereas, conscientiousness is a stronger predictor of organizationally directed CWB (Berry et al, 2007). The same three dimensions of the Big Five relate to employee turnover (Zimmerman, 2008). Emotional stability is related to reactive forms of adaptive performance, whereas, ambition is related to proactive forms of adaptive performance (Huang, Ryan, Zabel, & Palmer, 2014).
- Direct measures of Factor Alpha such as integrity tests and customer service scales tend to predict overall job performance and CWB with higher criterion-related validities than their Big Five underpinnings of conscientiousness, agreeableness, and emotional stability (Ones & Viswesvaran, 2001; Ones, Viswesvaran, & Schmidt, 2012).
- There may be nonlinear relations between some personality measures and some criteria. Focusing on job performance, Le, Oh, Robbins, Ilies, Holland, and Westrick (2011) examined the linearity of conscientiousness and emotional stability relations with task, citizenship, and counterproductive behaviors in two samples. These two personality dimensions related positively to performance at a decreasing rate, asymptoting at about 1 SD units above the mean for each trait. There was also evidence of diminishing returns to increasing conscientiousness in terms of CWB reduction. Carter, Dalal, Boyce, O'Connell, Kung, and Delgado (2014) reported similar findings for conscientiousness and the same job performance facet relations. Again, decrements to performance occurred at about 1 SD units above the mean for task performance and organizational citizenship behaviors. Focusing on leadership performance, Grijalva, Harms, Newman, Gaddis, and Fraley (2015) exam-

ined whether narcissism is nonlinearly related to leadership effectiveness in six samples and found a small nonlinear quadratic effect. Benson and Campbell (2007) reported similar weak nonlinear effects for a personality derailment composite and moving against personality traits in relation to leadership.

- Criterion-related validities of personality variables may be stronger in the long term than in the short term. Rare longitudinal investigations of personality variables suggests that the moderate validities typically reported represent short-term, limited effects of personality and personality variables are more potent in the long term where typical performance effects compound over time (see Lievens, Ones, and Dilchert, 2009 for an example from medical education).
- Criterion-related validities of conscientiousness measures generalize across cultures. There may be some cross-cultural variation of criterion-related validities of other personality attributes. In Europe, emotional stability appears to be a useful predictor, but validities are negligible or too variable for other Big Five dimensions. In Confucian Asian countries, extraversion, emotional stability and to a lesser extent agreeableness and openness predict performance, but openness relations are highly variable (see Ones, Dilchert, Deller, Albrecht, Duehr, & Paulus, 2012 for a summary).
- Finally, personality variables demonstrate incremental validity over cognitive ability tests (Ones, Viswesvaran, & Schmidt, 1993; Schmidt & Hunter, 1998).

Subgroup differences

Using personality measures for organizational decision making requires knowledge of differences among various groups assessed because if and when groups perform differently on average, differential hiring rates can result, leading to adverse impact. Some group differences are universally relevant and are of interest globally. They include gender and age differences. Others are only relevant for certain countries (e.g., racial differences, ethnic group differences). Here we discuss gender and age differences, but mention racial/ethnic group differences in connection with the US legal context.

Considering gender differences in personality, there are two theoretical perspectives to consider. The first one considers men and women to be psychologically similar and attributes any differences that may be found to culture (Eagly & Wood, 1999). The second one considers gender differences to be

based on biological sex differences and tends to explain differences based on biology and evolution (Buss, 1997). The first meta-analytic investigation of gender differences in personality examined data from a small number of inventories' norms, reporting with moderately higher scores for men on the dominance/assertiveness facet of Extraversion and moderately higher scores for women on the tender mindedness facet of agreeableness (median standardized effect sizes of .47 and $-.56$, respectively) (Feingold, 1994). Differences for the anxiety facet of neuroticism and trust facet of agreeableness were smaller, but revealed higher scores for women (median standardized effect sizes of $-.28$ and $-.20$, respectively). Differences on openness and conscientiousness were negligibly small. These findings have since been replicated many times over across multiple cultures (Costa, Terracciano, & McCrae, 2001; Lynn & Martin, 1997) as well as in other-ratings (McCrae, Terracciano, & 78 Members of the Personality Profiles of Cultures Project, 2005). Furthermore, it appears that larger gender differences are found at the aspect and facet levels of the Big Five than for the global Big Five factors (Weisberg, DeYoung, & Hirsh, 2011).

Interestingly, gender differences appear to be larger in developed and egalitarian cultures where women ought to have more opportunities. Costa et al. (2001) found that across 26 cultures, women tended to be more neurotic, agreeable, warm, and open to feelings, while men tended to be more assertive and open to ideas. Additionally, they uncovered a counter-intuitive finding whereby cultures that were less traditional in their gender roles (i.e., American and European countries, which are also more economically prosperous) showed larger gender differences in personality than cultures with more traditional gender roles (which were generally less economically prosperous). This finding was replicated using other-reports of personality (McCrae et al., 2005) and using a different measure of personality (Big Five Inventory; Schmitt, Realo, Voracek, & Allik, 2008). In general, these findings may reflect gene-environment interactions. Specifically, personality attributes of men and women may be 'less constrained and more able to naturally diverge in developed nations. In less fortunate social and economic conditions, innate personality differences between men and women may be attenuated' (Schmitt et al., 2008, p. 168).

Complicating male-female comparisons are variability differences between men and women (Shen, Ones, Duehr, & Foldes, 2010). McCrae et al. (2005) examined whether personality traits were more variable in some cultures than others using the average variability across 30 personality facets. They found that cultures that were more

traditional in gender roles and less economically developed generally exhibited less personality variability than more gender egalitarian and economically developed cultures. Borkenau, McCrae, and Terracciano (2013) utilized other-ratings of personality to reveal larger male variances and stronger gender variability differences in individualistic countries, leading them to conclude 'individualistic cultures enable a less restricted expression of personality, resulting in larger variances and particularly so among men' (p. 11). These results suggest caution is necessary when using aspect and facet measures of the Big Five, especially in developed, egalitarian, individualistic cultures. Relevant scale level data from relevant samples can and should be used to explore consequences of using a given personality measure in decision making. A good example of this is available for integrity tests, where US-based data show negligible gender differences (Ones & Viswesvaran, 1998).

As populations around the world age, age differences in personality measures can be expected to attract increasing attention from IWO psychologists. Personality-age relations have largely been studied in the context of development. Rank order of individuals on personality traits are stable across time (Ferguson, 2010; Roberts & DelVecchio, 2000). However, there are (a) mean-level differences in personality between different age groups as evidenced in cross-sectional research (Srivastava, John, Gosling, & Potter, 2003) and (b) changes across the lifespan as revealed in longitudinal studies (Roberts, Walton, & Viechtbauer, 2006). Conscientiousness, emotional stability, Agreeableness, and assertiveness aspect of Extraversion increase across the lifespan, though increases are most prominent in early adulthood and the rate of change decreases over time. These changes amount to about half a standard deviation or more for each trait when older and younger individuals are compared. Social vitality and openness decrease in old age, though the magnitudes of the changes are in the $-.10$ to $-.20$ SD range. These findings suggest that age differences in Big Five personality measures are unlikely to lead to adverse impact for older individuals. However, little is known about age differences on aspect, facet, and compound measures. Again a couple of exceptions are integrity tests and managerial potential scales where age differences have been shown to be negligible (Hough, Ones, & Viswesvaran, 1998; Ones & Viswesvaran, 1998).

Race and ethnic group of interest in a given society vary around the world. Here we briefly note that based on a meta-analysis of data from the United States, various racial and ethnic groups do not differ substantially (Foldes, Duehr, & Ones, 2008). Minority-white differences are smaller on the Big Five than on some facets.

Response Distortion

Many organizations remain reluctant or unwilling to incorporate personality measures in selection decisions out of concerns that respondents may distort their responses to convey a socially desirable impression. Researchers have typically distinguished between response distortion as situationally bound, intentional mis-representations (impression management) and general, honestly held self-misperceptions (self-deception; e.g., Paulhus, 1984). Though self-deception is certainly a prominent concern among IWO psychologists, the majority of response distortion research has focused on intentional impression management that occurs specifically among applicants. Such duplicitous behavior is a slippery fish to grasp for researchers. According, it is impossible to divorce any study's conclusions about the effects of response distortion from how the researchers operationalized response distortion. Over 80 years of research on response distortion has produced a literature that is voluminous, complex, and unlikely to offer a simple yes or no to whether response distortion is problematic for measuring personality. However, we briefly summarize here what is known about (a) the psychometric consequences of response distortion, (b) the prevalence of response distortion among actual applicant samples, and (c) how to curtail or remediate the effects of response distortion.

Psychometric consequences

A body of literature has used laboratory studies that instruct participants to fake to document the psychometrically deleterious effects that (intentional) social desirability has on personality measures. Such studies show that scores increase substantially (by as much as 1.0 standard deviation; Hooper, 2007; Viswesvaran & Ones, 1999), and individuals who have faked responses are markedly more likely to rise to the top of applicant pools (R. Mueller-Hanson, Heggstad, & Thornton, 2003). Instructions to fake also substantially reduces the variability in personality measures, with standard deviations shrinking by as much as 75% (Hooper, 2007). Because individuals fake to different degrees, instructions to fake substantially changes the rank-ordering of respondents (Ellingson, Sackett, & Hough, 1999). In addition, instructed faking also changes the response options that respondents are likely to select (Kuncel & Tellegen, 2009). The effects of faking instructions on the criterion-related validity of personality measures have received more debate, with some studies showing that instructions to fake lower personality measures'

criterion-related validity (Stanush, 1997) and others showing instructed faking to have minimal impact on criterion-related validities (R. Mueller-Hanson et al., 2003). Faking instructions also collapses the factor structure of multidimensional personality inventories, such that previously independent scales tend to merge into one single factor (Ellingson, Smith, & Sackett, 2001; Schmit & Ryan, 1993). These effects of faking on factor structures suggest that social desirability represents a general method factor that blurs distinctions between traits (Biderman & Nguyen, 2009).

Response distortion among applicants

Although lab-based studies of response distortion are useful for learning about how intentional faking (impression management) affects personality measures, many authors have cautioned that findings about the prevalence of response distortion in lab-based faking studies may not generalize to actual applicant settings (Griffith & Robie, 2013). Studies that have compared the responses of actual applicants to those of incumbents (between-groups designs) offer some insight into response distortion that occurs among actual applicants. These studies have generally found that applicants describe themselves in more socially desirable ways than do incumbents, with meta-analytic d 's between .13 and .52 across the Big Five traits (Birkeland, Manson, Kisamore, Brannick, & Smith, 2006). However, such between-groups designs assume that applicant and incumbent samples have the same 'true' means on personality traits themselves and differences in means are attributable to response distortion. This assumption may be untenable, as many between-groups studies have not even matched applicants and incumbents on jobs; those that have produce more conservative estimates of mean differences ($.10 < d's < .31$; Birkeland et al., 2006). In this regard, within-subjects studies (wherein a single sample completes the personality measure in both incumbent and applicant settings) are more informative by ensuring that applicants' and incumbents' underlying true scores are equal. However, estimates from these studies vary from being modest (average $d = .08$; Ellingson, Sackett, & Connelly, 2007)² to substantial ($d = .64$; Griffith, Chmielowski, & Yoshita, 2007).

More direct evidence comes from research that sought to examine the proportion of applicants who fake. These methodologies have varied from admissions collected via a randomized response technique (Donovan, Dwight, & Hurtz, 2003) to classification based on applicant-incumbent change scores (Griffith et al., 2007) to 'overclaiming' (endorsing familiarity with fictitious people, events, and products; Bing, Klumper, Davison, Taylor, & Novicevic,

2011) to forming mixed-model item response theory subgroups (Zickar, Gibby, & Robie, 2004) to even identifying 'blatant extreme responders' (respondents who only endorse extreme response options; Landers, Sackett, & Tuzinski, 2011). Griffith and Robie (2013) summarized these studies as indicating around 30% of applicants likely engage in some form of faking (with a 'confidence interval' of about 10%). However, faking occurs more commonly in the form of exaggerating positive qualities rather than outright, extreme fabrication (Donovan et al., 2003; Zickar et al., 2004). Moreover, the extent of faking likely depends on a number of contextual factors that affect individuals' perception of the opportunity, necessity, and likely outcomes of faking (Goffin & Boyd, 2009; McFarland & Ryan, 2000). For example, Landers et al. (2011) show how the spread of rumors about how to fake within an organization substantially increased the blatant extreme responding form of faking. In contrast, Ellingson et al. (2007) noted that faking may have been substantially reduced in their sample (a managerial sample) because compensatory characteristics (e.g., experience, intelligence) likely reduce the perceived necessity to fake. Thus, it is clear that faking is an issue that should be of concern to organizations selecting on personality measures (even in setting cut-scores for selection; see Berry & Sackett, 2009), though the prevalence of applicant faking in particular may vary by particular contexts.

Other research has examined the prevalence of response distortion in retesting samples (applicants re-applying for a job following rejection; e.g., J. Hogan, Barrett, & Hogan, 2007). In such studies, applicants presumably have stronger motivation to distort their responses at retest to ensure they are not rejected again. However, the means of retesting groups are generally comparable to means during the initial application stage. In addition, personality inventories' factor structure generally remains unchanged between administrations. Thus, it doesn't appear to be the case that applicants strongly shift their approach to responding to a personality inventory after they have been rejected.

Research has also examined the impact that the applicant context has on personality measures' criterion-related and construct validity (relative to research/incumbent samples). The criterion-related validity of personality traits tends not to decrease in applicant samples relative to incumbent samples (Hough, 1998; Ones et al., 1993), though personality criterion-related validities may not always be affected by even extreme response distortion (R. Mueller-Hanson et al., 2003; see also Zickar, Rossé, Levin, & Hulin, 1996). Research has been mixed regarding whether applicant samples produce similar factor structures and item response

patterns as incumbents (cf, Ellingson et al., 2001; Robie, Zickar, & Schmit, 2001; Schmit & Ryan, 1993; Stark, Chernyshenko, Chan, Lee, & Drasgow, 2001; Zickar et al., 2004). Regardless of differences or similarities in applicant's criterion-related validities or basic psychometric properties, individuals who engage in response distortion tend to rise to the top of applicant pools even though their subsequent performance may be lower (Griffith et al., 2007; R. A. Mueller-Hanson, Heggstad, & Thornton, 2006). Thus, response distortion can be most problematic when personality measures are used to 'select-in' the very top applicants rather than to 'select-out' the lower scoring bottom applicants.

More broadly, some scholars have questioned whether 'faking' is truly a threat to the validity of a measure. For example, (R. Hogan & Foster, 2016) argued that the response patterns of social desirability that an individual displays in answering personality items mirrors those that will be displayed in social interactions with others. This perspective eschews the notion of personality measures as assessing traits as some intra-psyche characteristic but rather posits that completing a personality measure is a type of simulation for how individuals will convey an impression when they behave. Indeed, individuals who are insensitive to social norms and display rules about how to convey a positive impression may lack critical interpersonal skills or understanding about what will be expected of them in the workplace. However, even if applicants' response distortion does mimic impression management behaviors that will later facilitate higher job performance, applicant response distortion could still be a concern for several reasons. First, distorting the impression conveyed on a personality inventory is likely markedly easier than improving the impression conveyed through social interactions, particularly over a sustained period. Second, if this perspective is correct, applicant personality assessments would likely predict performance in scenarios whose potential rewards for conveying particular impressions are similar to those present in the selection process. Nonetheless, this perspective serves as an important reminder that 'faking' is not a behavior localized to personality assessments. In addition, faking behavior is not always duplicitous; it may manifest in ways that are in fact valued by organizations.

Detecting and discouraging response distortion

Psychologists have a long legacy in creating scales designed to assess who has distorted their response on personality measures. Classic social desirability scales typically embed items describing unlikely virtues within personality inventories (e.g., 'I have never intensely disliked anyone'; Crowne &

Marlowe, 1960). Though some individuals could legitimately agree with these items, these scales presume that a pattern of endorsing such unlikely virtues items indicates socially desirable responding. However, multi-method studies (e.g., Connelly & Chang, 2016; R. R. McCrae & Costa, 1983) indicate that these scales correlate much more strongly with actual personality traits (specifically, emotional stability and conscientiousness) than with self-report method variance associated with response styles. Moreover, large-scale studies have consistently shown that social desirability scales do not moderate or suppress personality measures' criterion-related validity (Hough, Eaton, Dunnette, Kamp, & McCloy, 1990; Ones, Viswesvaran, & Reiss, 1996), and 'correcting' personality measures based on social desirability scale scores does not improve prediction (Ellingson et al., 1999). Thus, classic unlikely virtues scales do not appear to function as designed, and researchers would do well to avoid using these scales as proxy variables for actual distortion among respondents (Griffith & Peterson, 2008).

More recently, a variety of alternate approaches to measuring response distortion have been developed (for an overview, see Burns & Christiansen, 2011). These new response distortion scales include measures based on response latency (Holden, 1995), 'overclaiming' knowledge about bogus items (Paulhus, Harms, Bruce, & Lysy, 2003), and unusual patterns of response option endorsement (Kuncel & Tellegen, 2009) or item covariance (Christiansen, Robie, & Bly, 2005). In general, these scales appear to be less contaminated with actual trait variance and, in the case of the overclaiming technique, have some support (Bing et al., 2011) for their ability to improve the validity of self-report personality measures. Though it is perhaps too early to regard these scales as clear indicators of response distortion, organizations may have a vested interest in developing and administering tools that can detect intentional response distortion, remediate its effects on personality measures, and improve fairness in using personality measures in selection. Thus, we encourage continued research examining how these scales assess self-report method variance and how they may moderate or suppress personality's criterion-related validity.

Warnings are popular, simple means of encouraging undistorted responses. Common sense dictates that if warned against untruthful responding, individuals in high stakes settings (e.g., job applicants) should try to engage in less (or less obvious) response distortion. In a small meta-analysis, Dwight and Donovan (2003) investigated whether warnings were effective in reducing faking. Combining data from personality and biodata measures, within- and between-subjects studies,

across traits, they tentatively estimated that warnings reduced faking by .23 SD units. In a follow up between-subjects, laboratory study using a sample of undergraduate students, they showed that telling test-takers that faking could be detected and would have consequences reduced mean-scores substantially. Warnings paired with negative consequences appear to lead to small or moderate reductions in personality scale scores. Subsequent research appears to support this finding (Dullaghan, 2010).

Pace and Borman (2006) provided a valuable taxonomy of warning types. First, the simplest type is the warning of identification, letting test-takers know there are mechanisms embedded in the test that can identify fakers. Such identification warnings can be elaborate with detailed explanations of detection methods or simple and ambiguous. Threats of verification may also be used. Second, type of warnings focus on consequences of faking described to respondents, ranging from mild to severe (e.g., retesting, exclusion from applicant pool). The third type of warning appeals to test-takers' reasoning and self-interest (e.g., that honest responding will result in a more accurate portrayal of their personal characteristics, may lead to positive consequences). The fourth type of warning is of an educational nature: these statements try to elaborate on the nature and purpose of the assessment, and clearly explain that if assessments yield accurate results, they are beneficial from the perspective of the organization (or test administrator). Finally, a fifth type of warning appeals to the moral conviction as well as self-perception of test-takers as moral beings. Research comparing relative effectiveness of these different types of warning is lacking, but is sorely needed.

A few studies have examined whether warnings improve criterion-related validity, with null results (e.g., Converse, Oswald, Imus, Hedricks, Roy, & Butera, 2008). It has been suggested that warnings may increase the cognitive load of some personality scales (Vasilopoulos, Cucina, & McElreath, 2005), and that convergent validities among scales designed to assess the same traits may suffer (Robson, Jones, & Abraham, 2007). Whether these concerns apply to all types of warnings is an open question. Nonetheless, the relative ease and cost-efficiency of warnings makes it a popular one in applied settings.

APPLICATIONS IN DEVELOPING EMPLOYEES

Although most IWO personality research focuses on issues related to selection (e.g., criterion-related validity, response distortion, adverse impact), personality inventories are administered

perhaps even more frequently to provide incumbents with developmental feedback about their strengths and weaknesses. Assuredly, this is frequently not an easy or comfortable endeavor for the parties involved, nor is it necessarily helpful for the recipient. For example, for the person scoring low on conscientiousness and agreeableness, how do you make it a useful process to tell them that they are a lazy jerk? The research literature on personality feedback is largely limited to a stream of research on the Barnum effect (the tendency for individuals to accept bogus, generic personality feedback as self-descriptive; see Furnham & Schofield, 1987). Thus, we have a larger scientific literature about how individuals respond to false personality feedback than to actual feedback.

What are potential outcomes of providing personality feedback to respondents? The research literatures on performance feedback and on personality development are informative. First, though personality traits tend to be relatively stable over the course of one's life, traits are far from immutable (Roberts & DelVecchio, 2000). Indeed, behavioral genetics research has shown that environmental factors can stimulate personality trait change (Hopwood, Donnellan, Blonigen, Krueger, McGue, Iacono, & Burt, 2011; Specht, Egloff, & Schmukle, 2011). However, the origins of personality change typically identified in personality development research typically reflect sustained changes in one's environment (e.g., becoming more Conscientious as one enters the workforce; Specht et al., 2011; Wood & Roberts, 2006). Thus, we (and most coaches using personality measures) view personality feedback as less useful for changing underlying traits but more useful in (a) helping individuals choose situations and roles in which they are more likely to succeed and (b) generating awareness to help in self-regulating behaviors.

Drawing on the performance feedback literature, feedback affects behavior when it (1) is accurately perceived, (2) is accepted, (3) cultivates a desire to respond, and then (4) generates intentions and goals (Ilgen, Fisher, & Taylor, 1979). Performance feedback is most effective when it directs attention toward the task and away from one's self (Kluger & DeNisi, 1996). These effects are augmented when paired with goal setting but diminished when the feedback threatens one's self-esteem. These principles don't bode well for personality feedback. Most personality feedback reports simply contain descriptive statements about assesseees, with few specifics about workplace implications or suggestions for improvement (Rickards & Connelly, 2011). Although such personality feedback may have merits in enhancing clients' self-awareness and well-being in clinical contexts (Costa, 1991), written personality

feedback as currently employed seems unlikely to have more than a modest effect on performance. However, pairing descriptive personality feedback with prescriptive recommendations for improvement boosted recipients' acceptance of the feedback, perceived utility, subsequent intentions to act, and affective responses (Rickards, 2011). Similar effects were observed when feedback was also provided orally (as might be the case in coaching applications of personality measures). Thus, though personality feedback has the potential for improving self-awareness and consequently self-regulation, written feedback likely needs some supplement to produce improvements in one's performance.

MEASUREMENT APPROACHES

New Developments in Self-Report Assessments

Forced choice

Personality measures typically present respondents' items one at a time and respondents are presumed to make absolute judgments. When respondents are asked to choose between two or more simultaneously presented items, respondents compare options and make relative (i.e., comparative) judgments. The latter response format is referred to as forced choice. That is, items are presented in blocks of two or more, and respondents indicate a choice or preference within each block. Items included in each block can be indicators of the same construct (unidimensional forced choice) or different constructs (multidimensional forced choice) (Brown, 2016). The use of forced-choice response format can help deal with a number of rater errors such as leniency, harshness, acquiescence, and use of a limited range of the rating scale (Cheung & Chan, 2002). Forced choice measures have a long history in attempts to control socially desirable responding. If items of similar social desirability are included in the same block, differences response choices should depend less on impression management (e.g., Christiansen, Burns, & Montgomery, 2005; Vasilopoulos, Cucina, Dyomina, Morewitz, & Reilly, 2006).

But forced-choice measures, if classically scored (i.e., scaled in relation to the person mean), hamper comparisons between individuals (Heggestad, Morrison, Reeve, & McCloy, 2006). Instead, they yield ipsative data best suited for comparisons of strengths and weaknesses within an individual. For purely ipsative measures, the sum of scores

across traits equals a constant (Clemans, 1956, Humphreys, 1957). The score dependency between traits wreaks havoc on psychometric properties of test scores such as reliability, factor structure, and criterion-related validity (Clemans, 1966; Hicks, 1970; Dilchert & Ones, 2011).

To recover normative data from ipsative, forced-choice measures, Item Response Theory (IRT)-based approaches can be used (e.g., Andrich, 1989; 1995). Two recent IRT-based approaches for modeling forced-choice data are Brown and Meydeu-Olivares' (2011) Thurstonian IRT model and Stark, Chernyshenko, and Drasgow's (2005) Multi-Unidimensional Pairwise Preference Model (MUPPM). The former can model item blocks of any size and using dominance items (i.e., assuming a response process where items are endorsed if their psychological value is above a threshold) (Brown & Meydeu-Olivares, 2010; Thurstone, 1927). The latter can model item pairs (blocks of 2 items) where an ideal point response process is assumed (i.e., item choice is indicative of maximum psychological value) (Coombs, 1960; Drasgow, Chernyshenko, & Stark, 2010).

Studies using both IRT-based approaches have reported effective recovery of normative scores from forced-choice data (e.g., Brown & Meydeu-Olivares, 2011; Stark et al., 2005). Measures using both are in applied use (e.g., OPQ® uses Thurstonian IRT modeling to score item triplets presented in 104 blocks, TAPAS uses MUPPM to measure Big Five dimensions and their facets relevant for military jobs). However, criterion-related validities of either do not appear to be superior to normative personality measures (e.g., Brown & Bartram, 2009[1999]; Drasgow et al., 2012).

We should also note that in forced-choice measurement, block size is an important consideration. As Brown (2016) noted 'large blocks increases cognitive complexity of choice tasks, and worsens the quality of data obtained, which may have adverse impact on less educated or people with lesser reading skills' (p. 157). This suggests that spurious correlations with cognitive ability should be expected with forced-choice inventories that use larger item blocks. Vasilopoulos et al. (2006) also found cognitive ability to be related to forced-choice personality scores for respondents completing the questionnaires under applicant conditions.

Apart from IRT scoring, there are some conditions under which forced-choice response format does not result in pure ipsativity, but quasi-ipsativity. These conditions occur when:

- (1) individuals only partially order the items, rather than ordering them completely; (2) scales have different numbers of items; (3) not all alternatives ranked by respondents are scored; (4) scales are

scored differentially for individuals with different characteristics or involve different normative transformations on the basis of respondent characteristics; (5) scored alternatives are weighted differentially; and (6) the questionnaire has normative sections. (Salgado, Anderson, & Tauriz, 2015)

Recent meta-analytic comparisons of ipsative and quasi-ipsative personality measures have revealed that quasi-ipsative personality measures predict job performance better than single-stimulus personality inventories, especially for Conscientiousness (Salgado et al., 2015; Salgado & Tauriz, 2014). The effects appear to be weaker for neuroticism, agreeableness and openness.

Frame-of-Reference Measures

In an attempt to increase the criterion-related validity of personality measures, researchers have suggested to contextualize items and to provide test-takers with a frame of reference that conceptually overlaps with the criterion (Bing, Whanger, Davison, & VanHook, 2004; Schmit, Ryan, Stierwalt, & Powell, 1995). In the work context, contextualization can be achieved by simply supplementing a generic personality item with a context-specific tag, such as 'at work' (e.g., 'I worry about things, *at work*'). Alternatively, the context can be provided in the instructions of a questionnaire.

The underlying idea of contextualizing personality items is that the criterion-related validity may improve when specific work-related individual differences are assessed as opposed to general individual differences over the full range of life domains. This idea is in line with Mischel and Shoda's (1995) cognitive-affective personality system theory suggesting that individuals behave more consistently in similar situations than across different situations (Robie, Born, & Schmit, 2001). Research on situation-specific manifestations of personality and the acknowledgment that personality expressions may not only vary between but also within persons further supports this view (Bleidorn, 2009; Fleeson, 2001; Heller, Watson, Komar, Min, & Perunovic, 2007).

A meta-analysis comparing validities of contextualized versus noncontextualized personality measures confirmed that across all five dimensions of the FFM, contextualized measures yielded significantly higher validity estimates than noncontextualized measures (Shaffer & Postlethwaite, 2012). How does imposing a frame of reference lead to validity gains? Lievens and colleagues (Lievens, De Corte, & Schollaert, 2008) provided evidence that the higher criterion-related validity of contextualized measures can be explained by

the fact that providing a frame of reference leads to reductions in within-person and between-person variability. Within-person variability arises in non-contextualized measures when test-takers use different frames of reference when answering generic items (e.g., work for item 1 and home for item 2). Within-person variability negatively affects the internal consistency reliability of a measure and it negatively affects criterion-related validity when a large number of items are answered with an incorrect frame of reference. Between-person variability arises in noncontextualized measures when some test-takers stick to one frame of reference of their choice (e.g., work, family/friends) for the entire measure while others switch between various frames of reference (work for some items and family/friends for others). Between-person variability only marginally affects the reliability of the measure, but it negatively affects criterion-related validity when a large amount of test-takers use incorrect frames of references.

Ecological Momentary Assessment

Researchers interested in studying personality and its relation to work-related outcomes have typically used one point in time self-report (or to a lesser extent peer-report) measures that capture participants' general personality dispositions. Using this approach, researchers have typically focused on differences between individuals and how these relate to work-related variables. This assessment approach and the focus on interindividual differences is in line with the classic conceptualization of personality traits as behavioral tendencies that are relatively consistent across situations and stable over time. However, personality researchers have increasingly acknowledged that individuals do not always act consistently across situations and have pointed to the necessity to consider within-person variability and incorporate the role of the situation in studying human behavior (Fleeson, 2004; Funder, 2001). The person-situation debate thus seems to have come to an end and researchers now try to shed more light on the dynamic interplay between the person, the situation, and behavior (Bleidorn, 2009; Fleeson, 2004; Funder, 2001; Judge, Simon, Hurst, & Kelley, 2014). To do so, they increasingly use ecological momentary assessment (EMA), also referred to as event- or experience-sampling methods (ESM) or simply diary methods (for detailed descriptions see e.g., Beal & Weiss, 2003; Bolger, Davis, & Rafaeli, 2003; Ohly, Sonnentag, Niessen, & Zapf, 2010; Reis & Gable, 2000). This methodology allows one to repeatedly assess psychological

states, experiences, and momentary behavior in a natural environment, as they occur, and track them over time. Based on theoretical considerations, researchers using EMA need to decide when and how to sample these momentary experiences. Using a time-contingent protocol, experiences are recorded at regular time intervals. Under a time-contingent protocol, assessments can be scheduled at fixed prescheduled time intervals (e.g., at the end of a working day, or in the morning and at bedtime), on a random basis throughout the day, or as a combination of both. Using an event-contingent protocol, assessments are linked to the occurrence of predefined events throughout the day (Beal & Weiss, 2003; Bolger et al., 2003; Reis & Gable, 2000). Furthermore, researchers can choose from a host of different ways to implement their EMA design, including paper-and-pencil surveys, personal digital assistants, web-based surveys, or mobile phone applications (Beal & Weiss, 2003; Green, Rafaeli, Bolger, Shrout, & Reis, 2006; Ohly et al., 2010).

Research on within-person fluctuations in work-related experiences and behavior has been growing exponentially in recent years, especially in the area of occupational health psychology. Despite this general trend, research on within-person variability in personality in the context of work is still scarce. Exceptions are studies by Judge and colleagues, who used experience-sampling methodology to show that daily work experiences predicted within-individual variation in personality (Judge et al., 2014), and by Debusscher, Hofmans, and de Fruyt (2016), who showed that CSEs do not only have a stable between-person component but also vary meaningfully from day to day within individuals. Furthermore, these within-person fluctuations in CSEs were related to within-person fluctuations in task performance, organizational citizenship behavior, and counterproductive work behavior.

Conditional Reasoning Tests

Building on earlier work on relative strength of different motives (e.g., Atkinson, 1957, 1981; McClelland, 1985), James (1998) proposed that individuals used reasoning processes to justify their behavioral choices (i.e., justification mechanisms) and that these justifications were an expression of their personality characteristics. If justification mechanisms supporting a given personality-related behavioral domain can be identified, tests that present those mechanisms as options to respondents can be created. Such measures present respondents with what appear on the surface to be logical reasoning problems. Respondents are asked to choose

the response that logically follows from an initial statement. But some alternatives reflect justification mechanisms associated with the trait being measured. Illogical options serve as distractors. It is presumed that individuals with high standing on the trait would select the justification option congruent with their trait. It is suggested that conditional reasoning tests are less fakeable because respondents believe that they are completing a reasoning test and may access variance untapped by conscious self-report (LeBreton, Barksdale, Robin, & James, 2007). Interestingly, if respondents are told the real purpose of the test, these potential advantages evaporate, and individuals can easily fake the conditional reasoning test (e.g., Bowler & Bowler, 2014; LeBreton et al., 2007).

Conditional reasoning tests have been constructed to measure achievement motivation, aggression, and integrity (Fine & Gottlieb-Litvin, 2013; James & McIntyre, 2000). Berry, Sackett, and Tobares (2010) reported a bare bones meta-analysis of a commercial Conditional Reasoning Test of Aggression. Based on 17 samples ($N = 3,237$), the mean validity for predicting CWB criteria was .16, with a large observed standard deviation (.19). Validities were found to be higher in developmental samples. Higher validities were also found when studies used continuous criteria and when non-students constituted the sample. Joint effects of these moderators could not be studied given the limited number of primary studies available. Even fewer studies (4) were available for the criterion of job performance. The mean observed correlation for that criterion was .14. Validities for more fine-grained facets of performance are unknown.

Many questions remain around conditional reasoning tests. Are justification mechanisms unconscious as claimed? Are the same justification mechanisms used universally across respondents of similar trait standing? How do job applicants react to conditional reasoning tests? Are there some personality constructs that are particularly amenable to measure using this format? Are criterion-related validities for those constructs higher? These and other questions await answers.

OBSERVER-REPORTS

In recent years, IWO psychologists have shown a resurgent interest in collecting personality ratings from observer-reports instead of (or in addition to) self-reports. Though personality ratings from different sources do show convergent validity (with

correlations among acquainted raters between .20 and .45, depending on the intimacy of the relationship and the visibility of the trait; Connelly & Ones, 2010), these correlations are far from unity or even thresholds for 'acceptable' reliability. These findings suggest that much stronger prediction is possible through aggregating trait ratings across sources. Indeed, when multiple raters of Conscientiousness are combined, validities for predicting overall job performance could climb from the $\rho = .20$ s for a single self-report to $\rho = .55$ for the combination of many raters (Connelly & Ones, 2010). From a multi-rater framework, reliance on a single rater of personality (e.g., using only a self-report measure) has drastically underestimated the impact of personality traits on behaviors, and the best way to improve the criterion-related validity of personality measures is to overcome these idiosyncrasies through aggregation.

In addition, two small-scale meta-analyses indicate that even a single observer's rating of personality traits are a stronger predictor of job performance than a self-report (Connelly & Ones, 2010; Oh, Wang, & Mount, 2011). These effects appear to emerge even for observers who have never directly observed targets in the workplace, suggesting that other people may have a clearer view on our personality than we do ourselves, at least for predicting job performance (Connelly & Hulsheger, 2012). One potential mechanism for this is that self-reports contain both relevant trait information but also variance from self-enhancement. Whereas positive traits like Conscientiousness and Agreeableness may promote positive correlations between self-reports and performance, these effects are partially suppressed by negative effects of self-enhancing on these traits (Connelly & Chang, 2015; Connelly & Hulsheger, 2012). In addition, research has also shown that self- and observer-report measures can interact, such that scoring high on either self- or observer-reports can mitigate negative behaviors at work (Kluemper, McLarty, & Bing, 2015).

These multi-rater findings raise an interesting conundrum for personality researchers: how can the trait-relevant information in personality ratings be separated from rater-specific personality perceptions like self-enhancement? Indeed, the discrepancies in the predictive power of self- and observer-reports suggest that more complex intra- and interpersonal processes may lurk in the personality measures beyond traits themselves. Recently, McAbee and Connelly (in press) presented the Trait-Reputation-Identity (TRI) Model for disentangling the personality perspectives that are shared between self- and observer-reports from those that are unique. This model uses latent variable modeling with multi-rater personality data as an empirical

method for bridging the research literatures of personality psychology, social cognition on 'The Self', and person perception. Specifically, the TRI Model fits a bifactor structural equations model across multi-rater personality data, specifying a common 'Trait' factor across raters and factors to specific to observer-reports ('Reputation') and self-reports ('Identity'). Such a model is valuable for separating a person's consensually rated standing on a personality trait (Trait) from the distinct way they present to others (Reputation) and their unexpressed or deluded self-knowledge (Identity). To our knowledge, no researchers have applied this model to studying job performance, though Kholin, Meurs, Blickle, Wihler, Ewen, & Momm (2016) found that the shared variance across self- and observer-reports (i.e., the Trait factor) is predominantly responsible for openness's relationship with academic performance.

Beyond the potential theoretical contributions from incorporating observer-reports of personality in IWO psychology, observer-reports also have potential practical applications for measuring personality. Observer-reports would seem to be particularly valuable in providing personality feedback for developing incumbents, where incumbents may stand to gain novel insights by incorporating the perspectives of others. On the other hand, feedback based exclusively on self-reports could have the potential to present employees with some of the same self-misperceptions that are related to impaired performance. For selection, observer-reports could markedly improve the validity of personality measures for forecasting future performance. Whereas conducting reference checks or soliciting letters of recommendation are common practices in selection, these methods typically generate poor predictive validity (Hunter & Hunter, 1984), likely because information is not collected or used in a standardized way. In contrast, replacing these methods with observer-reports of personality would offer a systematic method for collecting information on job-relevant tendencies. However, considerably more research is required for observer-reports to be viable in high stakes applications like selection. For example, although personality measures are often appealing for selection because they typically show minimal group differences, it is possible that observer-reports are susceptible to stereotypes or prejudices that could produce adverse impact against protected groups. In addition, it is unclear whether observer-reports would be more susceptible to forms of intentional response distortion in an applicant setting. On the whole, observer-reports represent a useful mechanism for improving the validity of personality measures, though additional research is required to streamline their integration in organizational practices.

CONCLUSION

The past 25 years have produced a renaissance of serious and systematic personality research in IWO psychology. In this chapter, we provided a whirlwind tour of theory and research surrounding personality variables in organizational settings. Given space constraints, we could not be comprehensive, but chose to discuss key variables and issues, relying on meta-analyses when available. Personality constructs offer rich explanations for many organizational behaviors, and these explanations will only become richer as we deepen our understanding of what personality is, where it originates from, and how its processes unfold. Organizations can benefit greatly from considering personality variables in decision making. In particular, the continuing expansion of the methods we use to measure personality (which include other-ratings of personality, triangulating personality assessment results, using ecological momentary assessment to capture state aspects of personality, and incorporating modern psychometric approaches) are likely to afford organizations utility gains in selection. The personality constructs assessed also need to expand beyond the Big Five factors. This is not to denigrate the Big Five dimensions of personality, but to suggest that depending on the criterion to be predicted, facets, aspects, and even meta-traits can potentially offer better prediction and understanding. At the same time, most, if not all, personality traits can be understood by considering their locations in relation to the Big Five family of traits (see Stanek & Ones, Chapter 13, this *Handbook*). Neglecting the ties of traits like Machiavellianism, grit, or interpersonal consideration to the Big Five is likely to lead to an impoverished understanding of those constructs and, in the aggregate, a messy jangle of constructs that the Big Five has helped to streamline. We expect that as personality constructs and the best ways to measure them become better understood and used in organizational research and practice, individuals, organizations, and society at large will benefit.

Notes

- 1 Up to this point, we have focused exclusively on Big Five/Five Factor Models of personality, though we note that some propose a six factor model that adds an Honesty-Humility factor (Lee & Ashton, 2004). In-depth review of Honesty-Humility extends beyond the scope of this chapter, but considerable debate has emerged regarding whether Honesty-Humility can be subsumed as

a 'bloated' facet of Agreeableness (cf, Ashton, Lee, & de Vries, 2014; McCrae, 2008). From a cybernetic perspective, Honesty-Humility reflects an alternate set of tendencies that assist in coordinating goal pursuit that may be more salient when deceit/guile is involved.

- 2 Ellingson, Heggstad, & Makarius (2012) note a general retesting effect. To account for this retesting effect, we report an average $d = .08$ by calculating the difference in average d 's between 'treatment' (applicant then incumbent samples and incumbent then applicant samples) and 'control' conditions (applicant each time and incumbent each time).

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Taxonomies and Compendia of Cognitive Ability and Personality Constructs and Measures Relevant to Industrial, Work and Organizational Psychology

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INTRODUCTION

Cognitive ability and personality are the two most important domains of individual differences in the world of work. Across organizations, cultures, and centuries, individual differences in cognitive ability and personality traits have played a critical role in all behavior, especially in organizations, from the manufacturing line to the Boardroom. Organizational practitioners measure individual differences in cognitive ability and personality because they are among the strongest and most robust, generalizable predictors of work behaviors and outcomes (Ones, Dilchert, Viswesvaran, & Judge, 2007; Ones, Dilchert, Viswesvaran, & Salgado, 2016). Employee productivity and performance is driven by knowledge and motivation (McCloy, Campbell, & Cudeck, 1994), but knowledge and motivation are a function of cognitive and non-cognitive variables. Beyond their role in performance, individual differences also help organizations identify, develop, and manage talent. Most organizations use cognitive ability and/or personality assessments for purposes that range from applicant assessments to career guidance to executive coaching to succession planning.

Cognitive ability and personality variables also occupy a central role in a multitude of academic theories and explanations (e.g., theory of

purposeful work behavior, Barrick, Mount, & Li, 2013; trait activation theory, Lievens, Chasteen, Day, & Christiansen, 2006; situational strength theory, Meyer, Dalal, & Bonaccio, 2009; socioanalytic theory, Hogan & Holland, 2003; social investment theory, Lodi-Smith & Roberts, 2007; job performance, Schmidt & Hunter, 2004). Correspondingly, thousands of research studies have examined traits from one or both of these domains.

A century-long increase in research and utilization has come at the cost of a proliferation of constructs. This is to be expected as cognitive ability and personality also have a long-standing history in other psychological subfields (e.g., developmental, clinical, social, counseling, school, and educational psychology, as well as other fields such as economics and gerontology), alongside Industrial, Work, and Organizational (IWO) psychology. Even though dominant models of the structure and organization of personality and cognitive ability traits exist (e.g., the Cattell-Horn-Carroll taxonomy for cognitive abilities [Flanagan & Dixon, 2013]; and the Five Factor Model [Costa & McCrae, 1992a; Goldberg & Sweeney, 1996]), they only incorporate a limited set of traits. This is not a criticism of these models, but rather a fact that reflects the limited information, technologies, and literature search mechanisms available to previous theorists in identifying all relevant constructs.

To make matters worse, jingle-jangle fallacies plague both ability and personality construct domains (Kelley, 1927; Thorndike, 1904). The ‘jingle fallacy’ describes cases when *different* constructs are labeled the same and considered interchangeable. The ‘jangle fallacy’ describes cases when two *equivalent* constructs are given different names, creating distinctions where none exist. As Block (1995, p. 210) noted, ‘Jingle-jangle fallacies—by no means limited to personality psychology—waste scientific time’. Regular updates to prominent taxonomies in individual differences domains can curtail unnecessary construct proliferation and coalesce findings, and indeed entire literatures, around a set of truly distinct and essential constructs. Without such organizing frameworks, research devolves into an uncooperative, un-cumulative exercise in which it is difficult to integrate findings across studies and formulate constructive insights.

Measures constructed to assess cognitive abilities and personality attributes also suffer from the same jingle-jangle fallacies. Correctly identifying the source traits tapped by different measures is essential for correctly interpreting study results, constructing explanations, and using them in forecasting and prediction. Compilations of measures assessing different ability and personality constructs can provide researchers with organizing frameworks for reviewing and meta-analyzing literatures. Clear and consistent identification of measures assessing each construct is also critical for linking the vast silos of research done using specific instruments. Practitioners can benefit from measure anthologies, which help identify scales they may wish to implement in applied settings. If leveraged appropriately, thorough and up-to-date construct taxonomies and measure compendia can better inform organizational practices, as well as academic research and theory-building.

Despite the general proliferation of cognitive ability and personality constructs and measures that has afflicted psychology for decades, ironically, we find the past 30 years of research in IWO psychology impoverished. Most research focuses on the Big Five dimensions of personality (e.g., Barrick, Mount, & Judge, 2001; Bono & Judge, 2004; Chiaburu, Oh, Berry, Li, & Gardner, 2011; Judge, Heller, & Mount, 2002) and general mental/cognitive ability without any further specification (e.g., Gonzalez-Mulé, Mount, & Oh, 2014; Sharma, Bottom, & Elfenbein, 2013). Discussions of whether more granular constructs and measures have greater descriptive, predictive, and explanatory power require better specification and utilization of the full range of variables implicated in the abilities and personality domains.

OBJECTIVES

The main objectives of this chapter are twofold. First, we aim to provide IWO researchers and practitioners with updated, contemporary taxonomies of cognitive abilities and personality attributes. Second, we compile and make available a vast catalog of measures for the constructs included in the cognitive ability and personality taxonomies. Our hope is that the information provided in this chapter will enable IWO psychologists to better understand and measure cognitive ability and personality constructs.

Role of Taxonomies

Establishing order and identifying patterns in observations and data calls for classification (Meehl, 1978). Consistent and valid classification of units, objects, and entities calls for taxonomies. Taxonomies serve as guides to knowledge about where given constructs are located and how they are similar to and distinct from other constructs included in the taxonomy. As such, they abate ambiguities. Constructs that are classified into the same class can be studied as a group (John, Naumann, & Soto, 2008). Thus, they result in parsimony. Taxonomies provide a standardized nomenclature, expediting knowledge communication and dissemination. Taxonomies bring order to scientific literatures, facilitating knowledge cumulation. Without taxonomies, chaos reigns.

Whereas taxonomies are crucial to the organization of constructs and findings, associated compendia of measures are instrumental in realizing the benefits of taxonomies. Measures are markers and exemplars of given constructs included in a taxonomy. By knowing which latent construct a given measure taps into, specific empirical findings can be correctly interpreted and organized (and meta-analyzed) to draw conclusions. Identifying duplicate or overlapping measures of the same trait requires compendia of measures that are tied to taxonomies. Taxonomies outline the relatedness of constructs; compendia of measures align research findings on those constructs from different studies, literatures, and even fields.

In the first half of this chapter, we describe an updated cognitive ability domain taxonomy and define each of its constructs. We also present a compendium of measures that serve as indicators of each construct. In the second half of this chapter, we present an updated taxonomy for personality constructs, including their definitions. A

compendium of measures that serve as indicators of each personality construct is also provided.

By presenting these taxonomies and compendia, our goal and hope is to prevent IWO psychology researchers and practitioners from falling victim to jingle-jangle fallacies. We also aim to expand their cognitive ability and personality horizons beyond general mental ability and the Big Five personality factors. These constructs have justifiably become embedded in our field because they help explain and predict organizational behavior (Ones et al., 2007; Ones, Wiernik, Wilmot, & Kostal, 2016). What we caution against is becoming entrenched in the perspective that for all behaviors and outcomes of interest, for all organizational phenomena to be explained using individual differences constructs, one single, general cognitive ability and five personality constructs are sufficient. Inertia of tradition can be powerful and a reminder is needed that there is a plethora of cognitive and personality constructs that may provide new scientific insights and applications.

COGNITIVE ABILITY

General cognitive ability is ‘a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience’ (Gottfredson, 1997, p. 13). Processes of sensing, perceiving, and manipulating mental information, as evidenced by performance on mental tasks, describe cognitive abilities (Carroll, 1993). Cognitive abilities capture ways in which ‘individuals differ from one another in their ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by taking thought’ (Neisser et al., 1996, p. 77).

An Updated Taxonomy of Cognitive Abilities

Cognitive abilities constitute a domain of interrelated abilities that are hierarchically organized, with a general cognitive ability factor (i.e., general mental ability or *g*) at the apex indicating the positive manifold amongst all of the more specific cognitive ability indicators (Carroll, 1993; Spearman, 1904). What lies between general mental ability and specific abilities has occupied factor analysts for over a century. These

meso-factors were subsequently termed ‘group factors’, and the invention of the ‘bi-factor’ method of factor analysis by Holzinger and Swineford (1937) resulted in the identification of five group factors. Other models (e.g., Kelley, 1928; Thurstone, 1931; Vernon, 1950) yielded differing sets of group factors, referred to as primary abilities (see Drasgow, 2003; Ekstrom, French, Harman, & Dermen, 1976 for summaries). By the 1970s, over 60 primary abilities were identified from hundreds of factor analyses.

Cattell’s (1957, 1963) investment theory of intelligence helped bring conceptual order to primary abilities. Second order factor analyses of primary abilities identified two higher order abilities: Fluid Ability and Crystallized Ability. Fluid abilities reflected basic reasoning and complex mental processes (e.g., induction, deduction), and crystallized abilities reflected investment of fluid abilities in acquiring knowledge, typically through education or exposure to areas of general and specific knowledge (Horn, 1965). The most comprehensive, empirical analyses of cognitive abilities have been conducted by Carroll (1993). His intensive study of over 460 cognitive ability correlation matrices remains one of the most wide-ranging efforts to elucidate the factor structure of the cognitive ability domain. His resulting three-stratum model included 69 narrow (i.e., specific) abilities (e.g., Closure Flexibility) in the first stratum, 8 group factors (i.e., primary abilities) (e.g., Broad Visual Perception) in the second stratum, and a general factor of cognitive ability, *g*, in the third stratum at the apex of the hierarchy. Carroll (1993) noted that the Cattell and Horn model of cognitive abilities was most consistent with his empirical conclusions. Subsequently, this three-stratum model of cognitive abilities has come to be referred to as the Cattell-Horn-Carroll (CHC) theory/model (McGrew, 1997, 2005, 2009a). In the past two decades, refinements to the CHC model have resulted in additional abilities being added (Schneider & McGrew, 2012). What is remarkable is not that primary abilities exist and are replicable. That was well-acknowledged with Ekstrom et al.’s (1976) compilation of major categories of cognitive abilities. Rather, the CHC model’s major contribution lies in the establishment of the cognitive abilities hierarchy and the replicability of specific factor–primary factor relations.

In this chapter, consistent with our aim to expand the cognitive ability construct horizons of IWO psychologists with well-substantiated taxonomies and constructs, we use the CHC taxonomy to organize primary and specific abilities based on Schneider and McGrew (2012) as well as McGrew, LaForte, and Schrank (2014). Although there is recent research challenging the CHC model and

suggesting adjustments to Carroll's three-stratum model based on new factor analytic work (Johnson & Bouchard, 2005; Johnson, te Nijenhuis, & Bouchard, 2007, 2008), the three-stratum model remains the dominant taxonomy of the cognitive ability domain. In accordance with the large amount of multi-sample evidence Carroll (1993) marshaled, which has been further built upon by intra-sample, cross-battery evidence (e.g., Flanagan & McGrew, 1998), it is unlikely that this model of cognitive ability will be replaced without a commensurately large accumulation of new, contradictory evidence (Ones, Dilchert, & Viswesvaran, 2012; cf. Major, Johnson, & Deary, 2012).

Modifications to the CHC taxonomy

Figure 13.1 shows the CHC model (McGrew, 2009a) further updated by the present authors.¹ Our modifications to the CHC model presented by Schneider and McGrew (2012) were primarily in hierarchical representations of the primary ability constructs, recognizing that there are currently probably up to 5 levels of cognitive constructs that can be reflected in the hierarchy. As is depicted in the figure, General Mental Ability (GMA), also referred to as general intelligence or *g*, is at the apex of the hierarchy. This means that all cognitive abilities tap into this general factor in varying degrees (Jensen, 2002). The observation of this general factor is pervasive and important since it accounts for approximately fifty percent of the common variance among broad cognitive ability test batteries (Lubinski, 2004).²

In the CHC model as typically represented, 12 primary abilities occupy the *same hierarchical level*. They are: Fluid Reasoning, Short Term Working Memory, Learning Efficiency, Retrieval Fluency, Visual Processing, Auditory Processing, Processing Speed, Reaction and Decision Speed, Quantitative Ability, Reading and Writing, Comprehension Knowledge, and Domain Specific Knowledge. Our revision to the CHC model presents the cognitive ability hierarchy as *imbalanced* (Diestel, 2000). That is, every primary ability of the CHC model is *not* at the same level of abstraction. For example, in the CHC model, Quantitative Ability, Comprehension Knowledge, and Reading and Writing are represented as occupying the same hierarchical level. However, we note that Quantitative Ability (i.e., Quantitative Knowledge) is more abstract than Comprehension Knowledge or Reading and Writing. Furthermore, the latter two are more closely related with one another than they are with Quantitative Ability. Thus, we introduced a higher order, more abstract Verbal Ability construct that is hierarchically above Reading and Writing and Comprehension

Knowledge to parallel Quantitative Ability, which is hierarchically above Mathematics Knowledge and Mathematics Achievement.

In addition, some primary abilities tend to be more closely related than others, calling for a higher order, latent construct rather than distinctly conceptualized primary abilities. For example, Quantitative Ability, Verbal Ability, and Domain Specific Knowledge all represent invested intelligence and are dimensions of Acquired Knowledge. In the CHC model, these are listed as distinct primary abilities without a higher order, latent construct unifying them. In our revision of the CHC model, Acquired Knowledge represents a higher order, crystallized ability. While this factor was also recognized by Cattell and Horn, our combination of these three sub-components and retention of the overall construct is unique. A higher order Memory factor has also been introduced hierarchically above two primary abilities: Short Term Memory and Long Term Storage and Retrieval. Finally, even though several specific abilities are included in the CHC's primary ability of Long Term Storage and Retrieval (e.g., Ideational Fluency, Originality/Creativity, Word Fluency), we sub-grouped them based on construct nomological net and cognitive process considerations. Thus, we represent Learning Efficiency and Retrieval Fluency as two major sub-dimensions of Long Term Storage and Retrieval. We recognize these two constructs as distinct factors and that Retrieval Fluency is more closely related to Acquired Knowledge and Processing Speed than Learning Efficiency (Jewsbury & Bowden, 2016). Yet, both require learning (i.e., committing information to long term memory) at some point in time.

Figural depiction of the updated cognitive abilities taxonomy

In Figure 13.1, specific abilities are hierarchically organized below their superordinate constructs. That is, superordinate primary abilities provide general information that is further refined in subordinate specific abilities. The lateral organization of the figure is from fluid ability at the left to acquired/crystallized abilities at the right end of the figure. The figure also indicates primary ability factors, organized according to brain function (grouped within shaded boxes) and conceptual relations (grouped within dashed lines in the figure). Memory, Speed, and Invested Abilities constitute three distinct areas of organization, according to brain function. Multiple primary and specific abilities are included in each distinct brain function-based cluster of (1) Memory, (2) Speed, and (3) Invested Abilities (i.e., Acquired Knowledge). For example, the Speed cluster

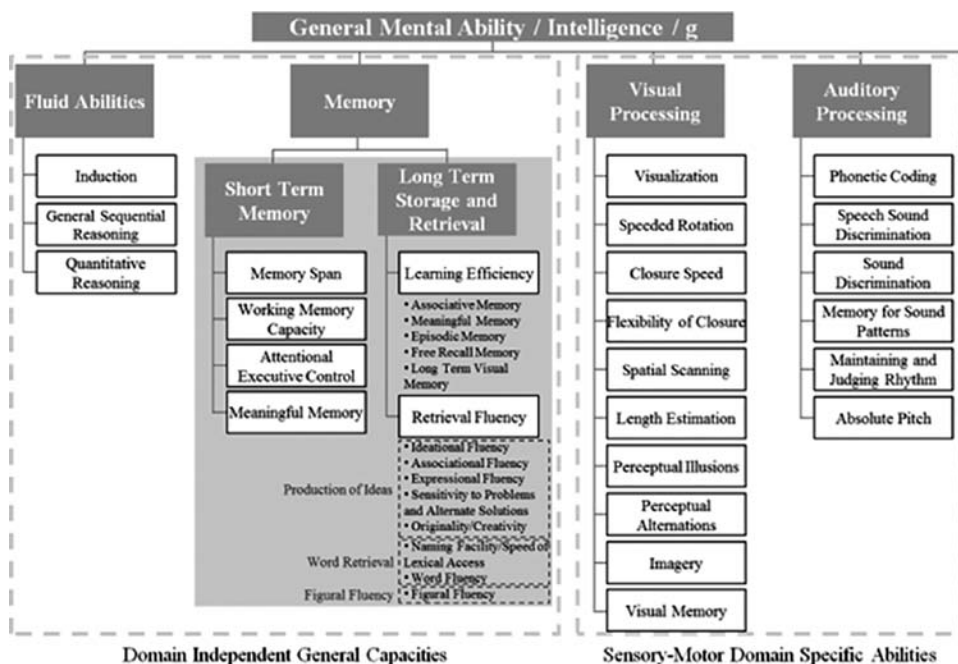


Figure 13.1 Cognitive ability constructs based on Schneider & McGrew (2012) as well as McGrew et al. (2014)

includes abilities relating to Processing Speed and Reaction and Decision Speed primary abilities. Primary abilities can also be grouped into domain-independent and domain-specific clusters. Domain-independent general capacities (e.g., Memory constructs and Fluid Abilities) as well as sensory-motor domain-specific abilities (e.g., Visual Processing and Auditory Processing) constitute conceptual clusterings. Although not reflected in Figure 13.1, *process-*, *speed-*, and *knowledge-*based clustering of primary abilities is also possible (Ackerman, 2000).

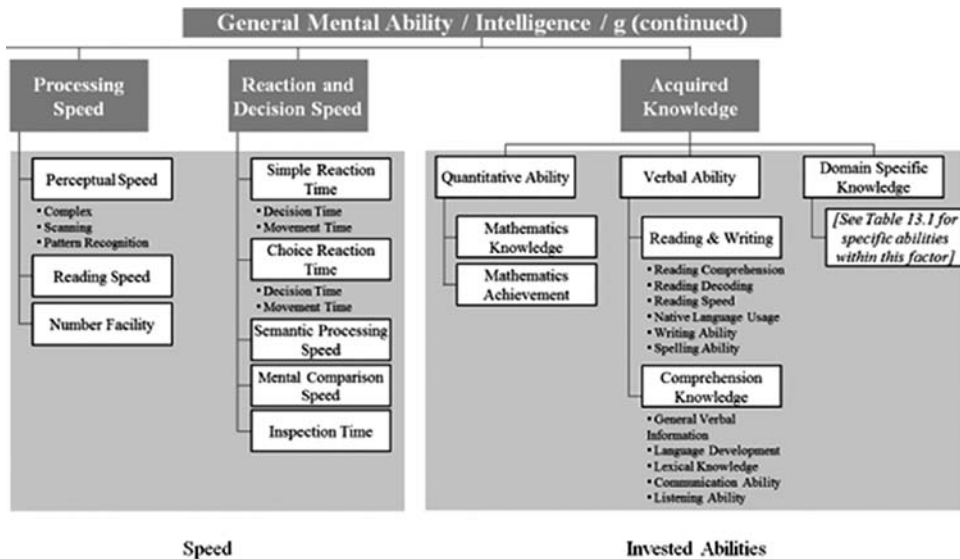
Some cognitive ability constructs from the CHC model were omitted from our update because they were either mostly irrelevant for IWO psychology or because we did not encounter their measures in the 1,000+ studies we examined for a series of meta-analyses (see below). They included: Figural Flexibility, Perceptual Speed – Memory, Rate of Test Taking, Speed of Articulation, Grammatical Sensitivity, Knowledge of Signing, Skill in Lip Reading, Serial Perceptual Integration, Resistance to Auditory Stimulus Distortion, Sound Localization, and Musical Discrimination and Judgment.³

Locating general cognitive ability in the taxonomy

Abilities that tap into multiple primary abilities (e.g., Memory–Long Term Storage and Retrieval

as well as Visual Processing) can be thought of as compound cognitive abilities and are not represented in the figure. However, interrelations among cognitive constructs are often quite strong. As a consequence, when multiple (e.g., 3 or more) primary cognitive abilities are assessed, the resulting score is more of an index of *g*, the latent general cognitive ability construct, than anything else. Similarly, if a Fluid Ability construct and an Acquired Knowledge/crystallized ability construct are combined (or variance from those two construct areas is significantly tapped) then the result likely provides an index of *g*.

Many decades ago, Gustafsson (1988) demonstrated fluid ability to be isomorphic to general mental ability, or at least the best indicator of *g*. This also reflects the unbalanced hierarchical nature of the abilities hierarchy: some primary abilities are more fundamental to the domain, reflecting a well-recognized pecking order (e.g., Fluid Ability versus Processing Speed). This imbalance would explain how *g* or fluid abilities permeate all levels of the abilities hierarchy while other primary abilities split apart. Properly modeling the unbalanced, complex hierarchical structure of cognitive abilities may benefit from novel approaches rather than traditional factor analytic methods (Bacon, 2001; Gerbing & Hamilton, 1996). When abilities are highly correlated, as they tend to be, traditional



factor analytic approaches distort the latent construct space.

To clarify the cognitive ability taxonomy we have provided definitions of each construct in Table 13.1.⁴ The first column indicates the construct name and the second column indicates the construct definition. Definitions for broad and specific abilities provided by McGrew et al. (2014) are quoted where possible and still appropriate because they were ‘derived from a review of Carroll’s 1993 seminal work via a series of communication exchanges with Jack Carroll’ (McGrew, 2016). We encourage those conducting research with these constructs or using them in applications to peruse the brief definitions provided in Table 13.1.

Both our update of the CHC taxonomy and each ability construct’s location in it are open to revision. The CHC model was never conceptualized as being static with steadfast categories (Schneider & McGrew, 2012). Expansions and revisions of the model are encouraged as additional research amasses large-scale or meta-analytic evidence for changes.

Compendium of Cognitive Ability Measures: Mapping Ability Measures to Constructs

To facilitate the use of the updated CHC taxonomy in IWO psychology research and practice, it is necessary to identify measures of constructs included in the model. We began mapping cognitive ability measures to constructs in 2009 when

the first author of this chapter started to work on meta-analyses of personality and cognitive ability relations. It became very clear early on that many authors were misunderstanding the measures they were using (e.g., inferring constructs based on scale names, overlooking construct-valid measures and research from outside their field of study/country, etc.). We realized that a guiding compendium would be valuable not only to our meta-analytic enterprise but also to practitioners and researchers at large, since many studies and organizations use cognitive ability measures.

In classifying the ability measures into the ability construct categories, each measure’s items and definitions, as well as quantitative evidence (primarily factor analytic and convergent/divergent ability findings), were examined to the extent they were available. This facilitated the categorization of cognitive ability measures into consistent construct categories. Several theoretical publications and quantitative factor analyses of multiple ability measures (e.g., Benson, Hulac, & Kranzler, 2010; Flanagan, Ortiz, & Alfonso, 2013; McGrew, 1997, 2009b; Salthouse, 2014) were also relied upon. *Buros Mental Measurements Yearbooks* (<http://buros.org>) often provided additional information and details to better understand each contributing measure. For many of the measures, we also had access to the actual test manuals/kits/items (e.g., Educational Testing Service [ETS] Kit Manual; Ekstrom et al., 1976). The ETS Kit Manual was especially helpful since it provided clusters of homogeneous constructs, construct descriptions, full item sets, and was developed by some of the leading cognitive ability psychologists of the era

Table 13.1 Cognitive ability constructs and definitions

<i>Construct</i>	<i>Definition</i>
<i>g</i>	General mental ability refers to the general ability that sits at the apex of all cognitive abilities. It has been described as the ability to learn and problem solve. Measures assessing it were either direct measures or measures combining multiple broad abilities to yield a general factor.
Fluid	Solving unfamiliar problems, in that performance does not depend on prior learning, but rather, on abstract reasoning. It involves processes such as inferential reasoning; concept formation; classification of novel stimuli; generalization of known solutions to new problems and contexts; hypothesis generation and testing; identification of relevant similarities, differences, and relations among diverse objects and ideas; recognition of relevant consequences of newly acquired knowledge; and extrapolation of trends in ambiguous situations. Day-to-day problem solving often relies on Fluid Ability. Measures that included items that assessed multiple, lower-level Fluid Abilities are included in the meta-analytic database as indicators.
Fluid–Induction	Discovering underlying rules or principles is at the core of this specific ability. Distinctions can be made between induction measures that utilize primarily verbal/auditory stimuli in the measures versus those that utilize visual/figural stimuli in the items. An example of the former is 16PF Factor B, an example of the latter is Raven's Advanced Progressive Matrices.
Fluid–General Sequential Reasoning	General Sequential Reasoning involves deductive reasoning (i.e., rule application). It is the ability to use principles and known premises to reason logically.
Fluid–Quantitative Reasoning	Using induction or deduction in reasoning with quantitative concepts (e.g., numbers, mathematical relations, operators, etc.).
Memory	'This higher-order construct involves combining both Short Term Memory and Long Term Storage & Retrieval constructs. Because different lower-level abilities contribute to this higher-order construct, the category is considered miscellaneous and not homogenous in its combination of lower-level Memory clusters'.
Memory–Short Term Memory	Short Term Memory encompasses both primary memory capacity and the efficiency with which information is manipulated within primary memory. It involves attention control mechanisms. Thus, it encapsulates encoding, maintaining, and manipulating information in immediate awareness. Measures for this category typically involve multiple categories of short term memory (e.g., memory span and meaningful memory) or they are measures that primarily require short term memory.
Memory–Short Term Memory— Memory Span	'The ability to encode information, maintain it in primary memory, and immediately reproduce the information [typically] in the same sequence in which it was represented' (Parenthetical not in original).
Memory–Short Term Memory— Working Memory Capacity	This is the part of Short Term Memory that involves focusing attention on the performance of simple operations, manipulations, transformations, and combinations of information in primary memory. It may involve executive control in avoiding distractions.
Memory–Short Term Memory— Attentional Executive Control	'The ability to focus on task-relevant stimuli and ignore task-irrelevant stimuli. The ability to regulate intentionality and direct cognitive processing.'
Memory–Short Term Memory— Meaningful Memory	'The ability to remember narratives and other forms of semantically related information ...' while it is maintained in primary memory.
Memory–Long Term Storage and Retrieval	'The ability to store, consolidate, and retrieve information over periods of time measured in minutes, hours, days, and years ... involves information that has been put out of immediate awareness long enough for the contents of primary memory to be displaced completely.' Measures included in this category tend to capture variance both from Learning Efficiency and Retrieval Fluency.

Table 13.1 Cognitive ability constructs and definitions (continued)

<i>Construct</i>	<i>Definition</i>
Memory—Long Term Storage and Retrieval—Learning Efficiency	The overall rate at which one can generally learn new material and store information (beyond what can be stored in working memory).
Memory—Long Term Storage and Retrieval—Learning Efficiency—Associative Memory	'The ability to remember previously unrelated information as having been paired'.
Memory—Long Term Storage and Retrieval—Learning Efficiency—Meaningful Memory	'The ability to remember narratives and other forms of semantically related information ... over periods of time measured in minutes, hours, days, and years'.
Memory—Long Term Storage and Retrieval—Learning Efficiency—Episodic Memory	Ability to remember details from single, autobiographical events (e.g., faces, times, places, addresses, and other who, what, when, where, why information)
Memory—Long Term Storage and Retrieval—Learning Efficiency—Free Recall Memory	'The ability to recall lists in any order'.
Memory—Long Term Storage and Retrieval—Learning Efficiency—Free Recall Memory—Incidental	Ability to recall incidental information, such as experiment instructions.
Memory—Long Term Storage and Retrieval—Learning Efficiency—Long Term Visual Memory	The ability to store, consolidate, and retrieve visual information over periods of time measured in minutes, hours, days, and years ... involves visual information that has been put out of immediate awareness long enough for the contents of primary memory to be displaced completely.
Memory—Long Term Storage and Retrieval—Retrieval Fluency	'The rate and fluency at which individuals can access information stored in long-term memory'.
Memory—Long Term Storage and Retrieval—Retrieval Fluency—Ideational Fluency	'Ability to rapidly produce a series of ideas, words, or phrases related to a specific condition or object. Quantity, not quality or response originality, is emphasized'.
Memory—Long Term Storage and Retrieval—Retrieval Fluency—Associational Fluency	'Ability to rapidly produce a series of original or useful ideas related to a particular concept ... quality rather quantity of production is emphasized'.
Memory—Long Term Storage and Retrieval—Retrieval Fluency—Expressional Fluency	'Ability to rapidly think of different ways of expressing an idea'.
Memory—Long Term Storage and Retrieval—Retrieval Fluency—Sensitivity to Problems and Alternate Solutions	'Ability to rapidly think of a number of alternative solutions to a particular practical problem'.
Memory—Long Term Storage and Retrieval—Retrieval Fluency—Originality/Creativity	'Ability to rapidly produce original, clever, and insightful responses (expressions, interpretations) to a given topic, situation, or task'.
Memory—Long Term Storage and Retrieval—Retrieval Fluency—Naming Facility/Speed of Lexical Access	'Ability to rapidly and fluently retrieve words from an individual's lexicon; verbal efficiency or automaticity of lexical access'. Including the ability to quickly call objects by their names.
Memory—Long Term Storage and Retrieval—Retrieval Fluency—Word Fluency	'Ability to rapidly produce words that share a phonological (e.g., fluency of retrieving words via a phonological cue) or semantic feature (e.g., fluency of retrieving words via a meaning-based representation). Also includes the ability to rapidly produce words that share non-semantic features (e.g., fluency of retrieval of words starting with the letter "T")'.
Memory—Long Term Storage and Retrieval—Retrieval Fluency—Figural Fluency	'Ability to rapidly draw or sketch as many things (or elaborations) as possible when presented with a non-meaningful visual stimulus (e.g., set of unique visual elements)'.

(Continued)

Table 13.1 Cognitive ability constructs and definitions (continued)

<i>Construct</i>	<i>Definition</i>
Visual Processing	'The ability to make use of simulated mental imagery (often in conjunction with currently perceived images) to solve problems'.
Visual Processing–Visualization	Visualization is the core of the Visual Processing construct and involves, 'The ability to perceive complex patterns and mentally simulate how they might look when transformed (e.g., rotated, changed in size, partially obscured, and so forth)'.
Visual Processing–Speeded Rotation	'The ability to solve problems quickly using mental rotation of simple images'.
Visual Processing–Closure Speed	'Ability to quickly identify a familiar meaningful visual object from incomplete (e.g., vague, partially obscured, disconnected) visual stimuli, without knowing in advance what the object is. This ability is sometimes called Gestalt Perception because it requires people to "fill in" unseen or missing parts of an image to visualize a single percept'.
Visual Processing–Flexibility of Closure	'Ability to identify a visual figure or pattern embedded in a complex distracting or disguised visual pattern or array, when knowing in advance what the pattern is'.
Visual Processing–Spatial Scanning	'Ability to quickly and accurately survey (visually explore) a wide or complicated spatial field or pattern and (a) identify a particular target configuration, or (b) identify a path through the field to a determined end point'.
Visual Processing–Length Estimation	'The ability to visually estimate the length of objects'.
Visual Processing–Perceptual Illusions	'The ability to not be fooled by visual illusions'.
Visual Processing–Perceptual Alternations	'Consistency in the rate of alternating between different visual perceptions'.
Visual Processing–Imagery	'Ability to mentally imagine very vivid images'.
Visual Processing–Visual Memory	'Ability to remember complex images over short periods of time (less than 30 seconds)'.
Auditory Processing	Abilities related to hearing and sounds.
Auditory Processing–Phonetic Coding	'Ability to hear phonemes distinctly'.
Auditory Processing–Speech Sound Discrimination	'Ability to detect and discriminate differences in speech sounds (other than phonemes) under conditions of little or no distraction or distortion'.
Auditory Processing–Sound Discrimination	'Ability to detect and discriminate differences in ... sounds and tones under conditions of little or no distraction or distortion'.
Auditory Processing–Memory for Sound Patterns	'Ability to retain (on a short-term basis) auditory codes such as tones, tonal patterns, or speech sounds'.
Auditory Processing–Maintaining and Judging Rhythm	'Ability to recognize and maintain a musical beat'.
Auditory Processing–Absolute Pitch	'Ability to perfectly identify the pitch of tones'.
Processing Speed	'The ability to perform simple repetitive cognitive tasks quickly and fluently'.
Processing Speed–Perceptual Speed	Perceptual Speed constitutes the core of Processing Speed. 'Speed at which visual stimuli can be compared for similarity or difference'.
Processing Speed–Perceptual Speed–Complex	'The ability to perform visual pattern recognition tasks that impose additional cognitive demands, such as spatial visualization, estimating and interpolating, and heightened memory span loads'.
Processing Speed–Perceptual Speed–Scanning	'The ability to scan, compare, and look up visual stimuli'.
Processing Speed–Perceptual Speed–Pattern Recognition	'The ability to quickly recognize simple visual patterns'.
Processing Speed–Reading Speed	'Rate of reading text with full comprehension'.
Processing Speed–Number Facility	'Speed at which basic arithmetic operations are performed accurately. Although this factor includes recall of math facts, Number Facility includes speeded performance of any simple calculation (e.g., subtracting 3 from a column of 2-digit numbers). Number Facility does not involve understanding or organizing mathematical problems and is not a major component of mathematical/quantitative reasoning or higher mathematical skills'.

Table 13.1 Cognitive ability constructs and definitions (continued)

<i>Construct</i>	<i>Definition</i>
Reaction and Decision Speed	'The speed of making very simple decisions or judgments when items are presented one at a time'.
Reaction and Decision Speed—Simple Reaction Time	'Reaction time to the onset of a single stimulus'.
Reaction and Decision Speed—Simple Reaction Time—Decision Time	The time taken to decide to make a response to a single stimulus.
Reaction and Decision Speed—Simple Reaction Time—Movement Time	The time taken to physically move a body part (e.g., a finger) to make the required response to a single stimulus.
Reaction and Decision Speed—Choice Reaction Time	'Reaction time when a very simple choice must be made'.
Reaction and Decision Speed—Choice Reaction Time—Decision Time	The time taken to make a decision when a very simple choice must be made.
Reaction and Decision Speed—Choice Reaction Time—Movement Time	The time taken to physically respond when a very simple choice must be made.
Reaction and Decision Speed—Semantic Processing Speed	'Reaction time when a decision requires some very simple encoding and mental manipulation of the stimulus content'.
Reaction and Decision Speed—Mental Comparison Speed	'Reaction time where stimuli must be compared for a particular characteristic or attribute'.
Reaction and Decision Speed—Inspection Time	'The speed at which differences in stimuli can be perceived'.
Acquired Knowledge	This higher order construct involves combining constructs from multiple Acquired Knowledge domains (e.g., Quantitative Ability, Verbal Ability, and Domain Specific Knowledge). Because different lower-level acquired knowledge constructs contributed to this higher order construct, the category is somewhat heterogeneous.
Acquired Knowledge—Quantitative Ability	'Depth and breadth of knowledge related to mathematics.... It consists of acquired knowledge about mathematics such as knowledge of mathematical symbols, operations, computational procedures, and other math-related skills'.
Acquired Knowledge—Quantitative Ability—Mathematics Knowledge	'Range of general knowledge about mathematics. Not the performance of mathematical operations or the solving of math problems. This factor is about "what" rather than "how" knowledge (e.g., What does π mean? What is the Pythagorean theorem?)'.
Acquired Knowledge—Quantitative Ability—Mathematics Achievement	'Measures (tested) mathematics achievement'.
Acquired Knowledge—Verbal Ability	Depth and breadth of knowledge relating to verbal and language skills in one's native language.
Acquired Knowledge—Verbal Ability—Reading and Writing	'Depth and breadth of knowledge and skills relating to written language'.
Acquired Knowledge—Verbal Ability—Reading and Writing—Reading Comprehension	'Ability to understand written discourse'.
Acquired Knowledge—Verbal Ability—Reading and Writing—Reading Decoding	'Ability to identify words from text'.
Acquired Knowledge—Verbal Ability—Reading and Writing—Reading Speed	'Rate at which a person can read connected discourse with full comprehension. Reading Speed is classified as a mixed measure of Gs (Broad Cognitive Speed) and Grw [Broad Reading & Writing Ability] in a hierarchical speed model'.
Acquired Knowledge—Verbal Ability—Reading and Writing—Native Language Usage	'Knowledge of the mechanics of writing (e.g., capitalization, punctuation, and word usage)'.

(Continued)

Table 13.1 Cognitive ability constructs and definitions (continued)

<i>Construct</i>	<i>Definition</i>
Acquired Knowledge—Verbal Ability—Reading and Writing—Writing Ability	‘Ability to use text to communicate ideas clearly’.
Acquired Knowledge—Verbal Ability—Reading and Writing—Spelling Ability	‘Ability to spell words’.
Acquired Knowledge—Verbal Ability—Comprehension Knowledge	‘Depth and breadth of [verbal] knowledge and skills that are valued by one’s culture’.
Acquired Knowledge—Verbal Ability—Comprehension Knowledge—General Verbal Information	Breadth and depth of knowledge that one’s culture deems essential, practical, or otherwise worthwhile for everyone to know.
Acquired Knowledge—Verbal Ability—Comprehension Knowledge—Language Development	This construct is at the core of Comprehension Knowledge. ‘General understanding of spoken language at the level of words, idioms, and sentences’.
Acquired Knowledge—Verbal Ability—Comprehension Knowledge—Lexical Knowledge	‘Knowledge of the definitions of words and the concepts that underlie them’.
Acquired Knowledge—Verbal Ability—Comprehension Knowledge—Communication Ability	‘Ability to use text to communicate ideas clearly’.
Acquired Knowledge—Verbal Ability—Comprehension Knowledge—Listening Ability	‘Ability to understand speech’.
Acquired Knowledge—Domain Specific Knowledge	‘Depth, breadth, and mastery of specialized knowledge (knowledge not all members of a society are expected to have)’. Measures listed for this construct are a miscellaneous category, given measures used in studies examined.
Acquired Knowledge—Domain Specific Knowledge—Foreign Language Proficiency	Achieved proficiency, rather than proficiency potential, in a foreign language.
Acquired Knowledge—Domain Specific Knowledge—Arts and Humanities	Knowledge about arts and humanities, including literature.
Acquired Knowledge—Domain Specific Knowledge—Arts and Humanities—Artistic Knowledge	Knowledge about theater, ballet, colors, and art.
Acquired Knowledge—Domain Specific Knowledge—Arts and Humanities—Culinary Knowledge	Knowledge about various kinds of foods and recipes.
Acquired Knowledge—Domain Specific Knowledge—Arts and Humanities—Literature Knowledge	Knowledge about books, poems, stories, and other works of literature.
Acquired Knowledge—Domain Specific Knowledge—Behavioral/Psychological—Behavioral Content Knowledge	Knowledge about behavior and psychology, broadly defined.
Acquired Knowledge—Domain Specific Knowledge—Business Knowledge	Knowledge of accounting, business, finance, marketing, sales, strategy, etc.
Acquired Knowledge—Domain Specific Knowledge (Unspecified Specific Construct/Miscellaneous Version of this Higher Order Construct)	This construct includes measures that assess heterogeneous knowledge specific to certain domains that did not have enough measures to justify a sub-construct.

Table 13.1 Cognitive ability constructs and definitions (continued)

<i>Construct</i>	<i>Definition</i>
Acquired Knowledge—Domain Specific Knowledge—Conventional Knowledge	Knowledge about conventional domains, such as administration, correspondence, etiquette, and religious teachings.
Acquired Knowledge—Domain Specific Knowledge—Investigative Knowledge	Knowledge relating to intellectual pursuits and investigative interests, including solving problems.
Acquired Knowledge—Domain Specific Knowledge—Occupational	Knowledge specific to occupations, such as air traffic controllers, police, and military.
Acquired Knowledge—Domain Specific Knowledge—Occupational—Military	Knowledge specifically tailored to occupations in the military (e.g., surveillance, combat).
Acquired Knowledge—Domain Specific Knowledge—Occupational—Police	Knowledge specifically tailored to law enforcement occupations (e.g., patrol, police academy knowledge).
Acquired Knowledge—Domain Specific Knowledge—Realistic Knowledge	Knowledge relating to realistic interests (not occupations), including farming, sports, and the military.
Acquired Knowledge—Domain Specific Knowledge—Realistic Knowledge (Applied)	Knowledge relating to the application of information-related realistic interests, including hunting and fishing.
Acquired Knowledge—Domain Specific Knowledge—Sciences—General Science Knowledge	General Science Knowledge includes knowledge about general science or about multiple areas of science (e.g., physics, biology, mechanics, engineering, electronics).
Acquired Knowledge—Domain Specific Knowledge—Sciences—Life Sciences Knowledge	Knowledge about living organisms, including anatomy, biology, botany, genetics, physiology, and zoology.
Acquired Knowledge—Domain Specific Knowledge—Sciences—Life Sciences Knowledge (Applied)	Knowledge relating to applying life sciences information in daily life (e.g., first aid and health literacy).
Acquired Knowledge—Domain Specific Knowledge—Sciences—Mechanical Knowledge	Knowledge about the function, terminology, and operation of ordinary tools, machines, and equipment.
Acquired Knowledge—Domain Specific Knowledge—Sciences—Natural Sciences Knowledge	Knowledge relating to natural sciences, combining knowledge of life sciences as well as physical sciences.
Acquired Knowledge—Domain Specific Knowledge—Sciences—Physical Sciences Knowledge	Knowledge relating to physical sciences, including astronomy, chemistry, Earth sciences, physics, and other related fields.
Acquired Knowledge—Domain Specific Knowledge—Sciences—Physical Sciences Knowledge (Applied)	Knowledge relating to applying physical sciences information in daily life.
Acquired Knowledge—Domain Specific Knowledge—Social Studies Knowledge	Social Studies Knowledge covers areas such as economics, geography, politics, and sociology, among others.
Acquired Knowledge—Domain Specific Knowledge—Social Studies Knowledge (Applied)	Knowledge relating to applying social studies information in daily life (e.g., traffic law, foreign travel knowledge).

Note: All quotes in this table are from *Woodcock Johnson IV Technical Manual*, McGrew, LaForte, & Schrank (2014).

(e.g., Guilford, Fleishman, Cattell, Carroll, Kelley, Zimmerman, Lord, Messick, etc.). Finally, we also had the benefit of having access to the original datasets used by Dr. John Carroll. Based on an examination of the above described materials, each ability measure was assigned to an ability construct in the current taxonomy by the present authors. In some difficult cases, direct input and guidance from cognitive ability experts (e.g., Dr. Kevin McGrew) facilitated classification. These efforts produced an initial compendium that was used in the first author's dissertation (Stanek, 2014). Since then, additional measures were identified for inclusion in the compendium, and the same process described above was used to assign them to the ability constructs they tap. Our previous classifications were also reviewed again by both authors and outside experts. Measures that were posed special challenges received input from Dr. McGrew.

Our compendium of ability measures is presented in Appendix A (available online at <https://study.sagepub.com/psychology>). This compendium is organized alphabetically by construct; within construct, it is organized alphabetically by measure and scale name. Construct paths/layers of the hierarchy are indicated with '-' marks (e.g., Memory-Long Term Storage and Retrieval—Retrieval Fluency—Word Fluency indicates that Word Fluency is part of Retrieval Fluency, which is part of Long Term Storage and Retrieval, which is part of Memory). Measures assessing compound abilities are listed at the end of the table in their own section.

Applications and implications of ability measures compendium

We hope that this compendium is helpful in accomplishing a number of objectives. Researchers and practitioners tend to equate their measures with the constructs that they intend to assess. By providing, in most cases, multiple exemplars of an ability construct's measures, we hope to provide a common language of ability constructs, regardless of measures used. We also hope that the compendium draws attention to documented, and in some cases undocumented, convergences across measures of the same construct. By considering the taxonomy and compendium jointly, divergences between measures can also be understood in terms of the ability factors assessed.

The compendium serves as a reminder that not all measures of cognitive abilities are equivalent. They all assess *g* to some degree, but some are better (i.e., more saturated) indicators than others. The widespread practice among IWO psychologists of assessing any cognitive ability and equating it to general mental ability represents sloppy thinking. We know and accept the vast literature on the value of general

mental ability in the prediction of overall and task job performance, as well as job training criteria (Kuncel, Hezlett, & Ones, 2004; Ones et al., 2016; Ones, Dilchert, & Viswesvaran, 2012; Ones, Viswesvaran, & Dilchert, 2004). However, there are other behaviors and outcomes of interest to researchers and organizations that may call for specific abilities. Even if one were interested in just general mental ability, the compendium of measures presented suggests that one cannot select any measure from the cognitive abilities domain and assume it assesses general mental ability. For example, we would have concerns over using only a verbal ability measure (e.g., a reading and writing measure). Care must be exercised in selecting and using cognitive measures in IWO research and applications.

A related issue involves combining all cognitive measures in a single meta-analytic estimate without regard to primary and specific abilities represented in addition to *g*. Meta-analytic estimates from such heterogeneous groupings can tell us little about whether the relations arise from the general factor of abilities, from the group factors, or from the specific factors represented in the included measures. If second order sampling error has been minimized (i.e., when a large number of studies using a multitude of measures have contributed to the meta-analysis), the variability associated with the estimated population effect size can give an indication about the potential moderating influence of abilities represented.

Finally, it should be clear from a perusal of the taxonomy and compendium presented here that the stimulus content is an unreliable indicator of primary and specific abilities assessed. There are many Fluid Ability measures that utilize verbal, quantitative, or figural content. What such measures share are requirements of reasoning using complex cognitive processes, such as induction and deduction. Among primary abilities, only Visual and Auditory Processing rely on specific, sensory-motor test content. For other primary and specific abilities, test stimulus can involve a variety of content (e.g., Quantitative Ability measures may include verbal content as in word problems). Ultimately, we hope that the compilation of measures we have presented in this chapter's ability measures compendium helps IWO psychologists think more carefully about our field's most powerful predictor when designing studies, conducting meta-analyses, interpreting findings, and utilizing them in applications.

Lastly, it is important to state that this compendium of ability measures is open for revisions and updates, with the latest version available online at stanek.workpsy.ch. Readers who may wish to suggest additions to the compendium or who may wish to propose revisions should contact the lead author of this chapter. Materials prompting the suggestion alongside a rationale should be provided.

PERSONALITY

Personality has been described as ‘an individual’s unique variation on the general evolutionary design for human nature, expressed as a developing pattern of dispositional traits, characteristic adaptations, and integrative life stories, complexly and differentially situated in culture’ (McAdams & Pals, 2006, p. 212), though our focus here is largely on dispositional traits.⁵ More dispositionally focused, as opposed to situationally focused, definitions also view personality as a non-unitary domain. Ones, Viswesvaran, and Dilchert (2005) refer to personality as:

A spectrum of individual attributes that consistently distinguish people from one another in terms of their basic tendencies to think, feel, and act in certain ways. The enduring nature and consistency of personality characteristics are manifested in predictable tendencies of individuals to behave in similar ways across situations and settings. (p. 390)

Although there are a multitude of definitions for personality traits, Fleeson’s (2012) distinction between descriptive and explanatory definitions is helpful. The former describe stable patterns in ‘affect, behavior, cognition, and desire (ABCDs) response to classes of stimuli that have been present in human cultures over evolutionary time’ (DeYoung, 2015, p. 35; cf. Wilt & Revelle, 2015). The latter call upon unspecified causal mechanisms (e.g., psychological and neurobiological processes) that underlie traits (DeYoung, 2015). In this chapter, we concern ourselves solely with description. That is, we focus on phenotypic personality constructs that are typically measured in self-report personality inventories. The etiology of each trait can help explain how it emerges, develops, and differentiates itself from other personality traits, but such explanatory accounts are beyond the scope of this chapter.

An Updated Taxonomy of Personality Constructs: The Pan-Hierarchical Five Factor Model

The Five Factor model was initially developed as a descriptive taxonomy spawned from lexical analyses of the English language (Allport & Odbert, 1936; Cattell, 1943; Goldberg, 1977. However, in the past several decades, research has matured to permit useful accounts of psychological functions of specific personality traits to be developed (DeYoung, 2015; Fleeson & Jayawickreme, 2015). More importantly, empirical research has

accumulated to the point where it is possible to organize the thousands of hypothesized and labeled personality characteristics into meaningful, interrelated clusters. Further, it has been shown that these interrelated clusters are hierarchically organized. The Big Five factors of Neuroticism (also referred to as Emotional Stability when describing its positive pole), Extraversion, Openness, Agreeableness, and Conscientiousness have been obtained from multiple methodologies over the past century, including lexical studies of phenotypic personality traits (e.g., Goldberg, 1993), joint factor analyses of personality instruments built to assess the Big Five, and factor analyses of personality instruments based on other theoretical perspectives (e.g., Gough’s folk concepts, Murray’s needs, psychopathology, etc.).⁶

As a result, the Five Factor model (FFM) is the most robustly supported model of personality structure when considering triangulation across many methods (i.e., not only lexical studies). It offers a viable, cross-culturally supported (McCrae & Costa, 1997; McCrae et al., 2002) framework that provides clarifying, organizational structure to the personality construct space. Despite its sturdy support, FFM not without critics (e.g., Block, 1995, 2010; Hough, 1992). Major criticisms are (1) that FFM does not describe the functional roles of traits and (2) that the Big Five are too broad to maximize predictive power. Contemporary research has started to develop theories that explain the genetic and neurological sources of the Big Five (DeYoung, 2010a, 2010b, 2015; DeYoung & Gray, 2009; Pincombe, Luciano, Martin, & Wright, 2007). The latter critique is addressed by recognizing that personality traits are hierarchically organized.

Personality structure has been examined in hundreds, if not thousands of factor analyses since the invention of the factor analytic method (Spearman, 1904). By now, factor analyses of meta-analytically derived personality construct relations paint a complex picture of personality’s structure (e.g., Connelly, Ones, Davies, & Birkland, 2014; Davies, Connelly, Ones, & Birkland, 2015; Markon, Krueger, & Watson, 2005; van der Linden, te Nijenhuis, & Bakker, 2010).

What has been emerging from recent meta-analyses and newer factor analytic work is first and foremost that personality traits are hierarchically organized. At the lowest level are responses to individual items, which have greatest specificity and narrowest bandwidth. One level higher are clusters of items that indicate personality facets. Facets reflect shared psychological meaning across a set of personality items, and can vary in specificity (e.g., homogeneous item clusters can be thought of as specific facets) and bandwidth. Facets that

share psychological meaning, and perhaps also similar etiologies, are further grouped into personality aspects (DeYoung, Quilty, & Peterson, 2007), which combine to define personality factors with meaningful *co-variation*, reflecting latent constructs. Traits at each hierarchical level represent psychological entities in their own right.

For example, Extraversion is a broad factor that encompasses co-variation from the aspects of Enthusiasm and Assertiveness, which themselves encompass various facets, such as Sociability (Gregariousness), Activity (Energy), and Dominance (Assertiveness) (Davies, 2014; Davies, Ones, & Connelly, 2009). Individual scales' items uniquely assess different Extraversion facets to various degrees. For example, 'I enjoy parties' is an item that primarily indicates Sociability, whereas 'I am good at persuading others' is an item that indicates Dominance. Similar to *g* in the cognitive ability domain, the global factor of Extraversion is defined by the common variance that is shared across such facets and items. Previous empirical research also supports the notion that personality facets capture variance beyond that captured by the global personality factors and that facet-level variance can indeed be attributed to unique genetic and environmental factors (Jang, Livesley, Angleitner, Riemann, & Vernon, 2002; Jang, McCrae, Angleitner, Riemann, & Livesley, 1998).

Higher order factors of the Big Five

It is important to bear in mind that although the Big Five factors were derived with the aim of being as independent as possible, they are not orthogonal. For example, based on the meta-analyses conducted by Ones (1993), Ones, Viswesvaran, and Reiss (1996) reported unreliability-corrected correlations among three of the Big Five (Conscientiousness, Agreeableness, and Neuroticism) that were above .20. These non-zero correlations indicate the possible presence of psychologically meaningful, higher order factors. These early indications have been supported by later investigations, such as Digman's (1997) factor analyses of intercorrelations among the Big Five factors, in which he identified two higher order factors. The first was the higher order construct of socialization, which involved abiding by society's rules, norms, and conventions; in other words, psychosocial maturity. Conscientiousness, Agreeableness, and Neuroticism defined this higher order factor, which Digman referred to as 'Factor Alpha' and more recently has been termed meta-trait 'Stability' (DeYoung, 2006; DeYoung, Peterson, & Higgins, 2002), though the psychological meaning of this higher order personality factor perhaps deserves a more inclusive term such as Integration or Socialization, the latter of which was also suggested by Digman (1997).

Shared variance between Extraversion and Openness form a higher order factor of 'personal growth', termed 'Factor Beta', and more recently referred to as 'Plasticity' (DeYoung et al., 2002). The meta-trait of Plasticity, also known as Exploration, is defined by exploratory tendencies that are reflected in both Extraversion and Openness. Extraversion contributes behavioral exploration whereas Openness contributes intellectual exploration to Factor Beta/Plasticity. Recent meta-analyses (Davies et al., 2015; Markon et al., 2005) and primary studies (DeYoung, 2006) have provided additional support for the existence of these two higher order factors in the personality hierarchy.

Finally, at the highest level of the personality hierarchy, there is evidence for a general factor of personality, at least in self-report measures (Davies et al., 2015; Irwing, Booth, Nyborg, & Rushton, 2012; van der Linden et al., 2017). Such a general factor in self-reports partially represents a global self-evaluation trait.

Figural Depiction of the Pan-Hierarchical Five Factor Model

Personality factor space is characterized by hierarchy. The hierarchical organization of personality described above is depicted in Figure 13.2. In constructing this figure, it became obvious that, unlike the cognitive ability literature, the existing personality literature does not offer a similarly comprehensive, broad, and deep personality taxonomy of traits (though the structure has been clearly articulated and depicted at the Five Factor and aspect levels, as well as at higher levels of the hierarchy [cf. Davies et al., 2015; DeYoung et al., 2007; Markon et al., 2005]). Thus, the challenge was in determining lower-level facets. In identifying facets of each of the Big Five, we used what has been referred to as nomological-net web clustering (Hough, Oswald, & Ock, 2015).

Nomological-net web clustering was first utilized by Hough and Ones (2001), in the predecessor of this chapter, when the authors presented a working taxonomy of personality constructs. The defining feature of this approach is an examination of the full nomological network of a proposed personality construct's convergent and divergent relations, as well as relations with external variables, including criteria. Constructs that exhibit similar relations with other variables, and strong relations with each other can be grouped together.

We started our work at the Big Five factor level and aimed to identify personality constructs that constitute facets. We were informed by the facets listed by Hough and Ones (2001). However, much recent empirical research has better-situated facets of each of the Big Five based on volumes of empirical data. For Conscientiousness, we

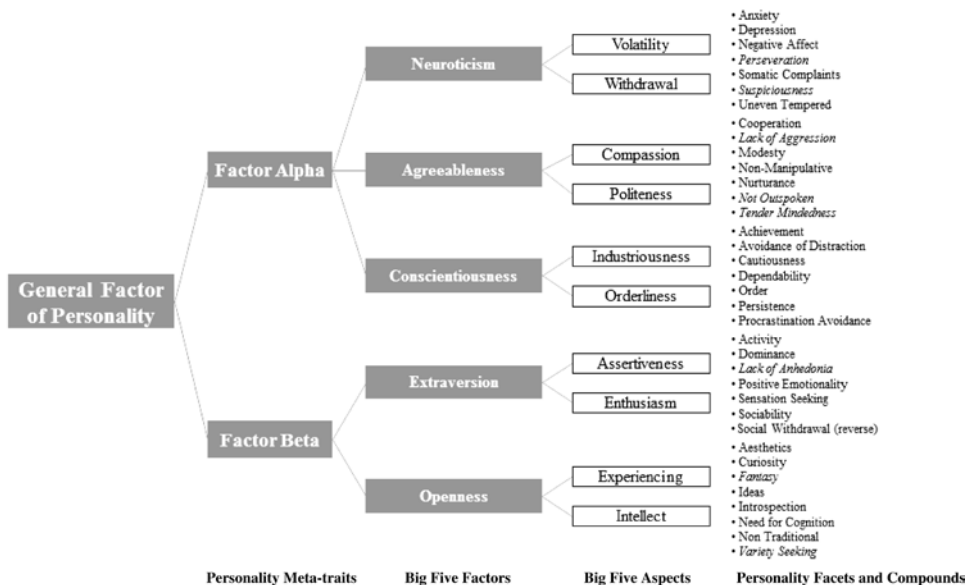


Figure 13.2 Personality constructs

Note: Construct names in italics indicate those constructs with consistent loadings on other Big Five factors. Aspects and facets are listed alphabetically since more research needs to be done to understand how each facet is related to each aspect.

heavily relied on the studies of Roberts and colleagues (Jackson, Bogg, Walton, Wood, Harms, Lodi-Smith, & Roberts, 2009; Roberts, Bogg, Walton, Chernyshenko, & Stark, 2004; Roberts, Chernyshenko, Stark, & Goldberg, 2005). For Openness, we relied on facets identified by Connelly et al. (2014) and Woo, Chernyshenko, Longley, Zhang, Chiu, and Stark (2014). For Neuroticism, a comprehensive meta-analysis and factor analyses from Birkland and Ones (2006) were used. For Agreeableness and Extraversion, we consulted the dissertation of Davies (2014), which presented structural examinations of each trait's facets based on meta-analyses of their convergent and divergent validities. The facets presented in these sources, as well as facets of the NEO Personality Inventory, were critically examined using a nomological-web clustering approach. In particular, convergent relations with similar constructs, divergent relations with theoretically unrelated constructs, and relations with work-relevant criteria (if available, especially from meta-analytic investigations) were examined. Similarities and differences in psychobiological bases, as well as developmental trajectories, were considered. Based on these considerations, facets of each of the Big Five were refined and adapted. For a few of the facets, we were also able to identify sub-facets, which were mainly defined by homogeneous item content used to measure

them. We erred on the side of splitting facets if the sources or empirical data suggested differential nomological-net web clustering features. For some of the 'new' facets or sub-facets, empirical evidence was lacking to determine if these constructs should truly stand apart. Nonetheless, our inclusion of these is based on our informed hypotheses and should be empirically examined in future research.

In understanding the hierarchical nature of personality constructs described above, it may be useful to keep in mind that responses to individual personality items are the expression of variance from multiple levels of the hierarchy. For example, an affirmative response to the item, 'I quickly get loud in a fight' captures variance from the General Factor of Personality, Factor Alpha, Agreeableness, the Politeness aspect, and the Cooperation facet, as well as unique variance that is specific to this item (i.e., unshared with latent traits at a higher level of the hierarchy) (Ones et al., 2005; Ones, Wiernik, Wilmot, & Kostal, 2016). Responses to personality items may also cull variance from disparate traits.

Compound personality constructs

Personality construct space is characterized by hierarchy but also by lack of simple structure (Dilchert, Ones, & Krueger, 2014; Markon et al., 2005). There are many personality attributes that

cannot be explained by a single superordinate trait, such as one Big Five dimension. They may represent variance from other Big Five dimensions. We have referred to such traits as compound traits or simply as compounds (Ones et al., 2005). Others have used the term 'blended' to describe such personality constructs (Ashton, Lee, Goldberg, & de Vries, 2009).

Obtaining uncontaminated ('pure') measures of personality facets and factors through combinations of items is not simple. More often, scales are composed of items that assess multiple dimensions within the personality hierarchy, and hence, indicate compound personality traits (Hough & Ones, 2001). For example, Ambition is a compound trait that draws variance from both Conscientiousness and Extraversion. In cases where a construct relates to Emotional Stability, Agreeableness, and Conscientiousness, it probably indicates the meta-trait Factor Alpha, though the amount of variance captured from each factor domain may affect the tilt of the construct toward that dimension. For example, integrity tests (Ones, Viswesvaran, & Schmidt, 1993) and customer service scales (Ones & Viswesvaran, 2008) both assess Factor Alpha (Stability/Socialization); however, integrity tests correlate somewhat more highly with Conscientiousness (Ones, 1993), whereas, customer service scales relate more closely to Agreeableness (Ones & Viswesvaran, 2008).

Table 13.2 presents a compilation of compound personality constructs. For each trait, the Big Five dimensions that contribute variance to that construct are indicated. Note that compound traits need not only represent variance from the Five Factor level of the personality hierarchy but can draw on variance from aspect, facet, and even meta-trait levels of the hierarchy as well (see Wilmot, DeYoung, Stillwell, & Kosinski [2016] for an example of this within the Self-Monitoring construct). The constructs listed in Table 13.2 are organized according to the Big Five dimensions tapped: Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness, rather than organized alphabetically by compound name, since the variance represented in each personality construct is more important than its name. Compound traits containing variance from Neuroticism are listed first and sorted according to whether or not they contain variance from Extraversion, Openness, Agreeableness, Conscientiousness, or other parts of the personality domain. For example, compound traits containing variance from all of the Big Five dimensions are listed first. Those that contain only variance from Neuroticism, Extraversion, Openness, and Agreeableness are listed second.

Those compounds that contain ingredients from Neuroticism, Extraversion, Openness, and Conscientiousness were listed next and so forth.

Most compound traits are not shown in the personality figure because they are interstitial traits (i.e., are located between two or more constructs in construct space) or blends (i.e., where different measures emphasize certain components and tilt traits to be more closely associated with different Big Five factors [e.g., Warmth can be more associated with Agreeableness or Extraversion, depending on the blend present in a given measure]). Displaying all of these in their proper locations would quickly render the figure unreadable.

In cases of conflicting information about the contribution of sizable variance from a Big Five trait to the compound being characterized, we used parentheses to indicate uncertainty. Table 13.2 also clears some confusion from the literature. For example, even though the trait-based Emotional Intelligence construct is listed, the fact that it measures the General Factor of Personality (van der Linden et al., 2017) is made clear by the designation that it represents variance from all Big Five dimensions of personality.

Finally, we note that it may be possible to align each compound trait with its closest dimension(s) based on theory and empirical findings, but considering its interstitiality is likely to produce better insight into both the etiology and utility of the trait. Consider Optimism, a compound trait related to both Emotional Stability and Extraversion. It is certainly possible to list Optimism as a compound facet of Extraversion or Emotional Stability. But only by considering these two traits jointly can the true nature of Optimism can be understood in terms of its place among personality constructs, its origins, trajectory, and, perhaps most consequentially for IWO psychologists, its usefulness in understanding, explaining, or predicting organizational behaviors. This is because compound traits reflect the unique, emergent properties of interactions among primary traits. In the case of Optimism, it reflects the unique patterns of affect and behavior that arise when individuals are high on both Extraversion and Emotional Stability.

To enhance common understanding and clarity around the meta-traits, Big Five factors, aspects, facets, and compounds, we provide brief definitions of each construct in Table 13.3.⁷

We also included constructs and measures related to social desirability and response sets. Scales measuring these constructs are often included in personality measures and often reflect individual differences in true personality traits (McCrae & Costa, 1983; Ones et al., 1996).

Table 13.2 Compound personality traits and Big Five constructs

Compound	N	E	O	A	C	Other
Emotional Intelligence	-	+	+	+	+	
Borderline Personality Disorder	+	+	+	-		
Interpersonal Sensitivity	-	+	+	+		
Achievement via Independence	-	+	+		+	
Generalized Self Efficacy	-	+	+		+	
Present Focused	-	+	+		-	
Intellectual and Confident	-	+	Intellect+			
Innovation	(-)	+	+			
Type A	+	+		-	+	
Hysteria		+		Lack of Aggression-		
Managerial Potential	-	+			+	
Passive Aggressive	+	-		-	-	
Self Monitoring-Other Directedness	+	(-)		-	-	
Social Suave	-	Sociability+		+		
Narcissism	(Volatility+, Withdrawal-)	+		-		
Psychopathy-Primary	-	(+)		-		
Self Esteem	-	+			+	
Locus of Control (Internal)	-	(Positive Emotionality+)			+	
Optimism	-	+				
Self Esteem-Accepting of One's Weaknesses	-	+			-	
Rumination	Perseveration+	Positive Emotionality-				
Routine Seeking	+		(Variety Seeking-)		+	
Resourcefulness	-		+		+	
Pragmatic	-		Intellect-			
Superstitiousness	+		+		+	

(Continued)

Table 13.2 Compound personality traits and Big Five constructs (continued)

Compound	N	E	O	A	C	Other
Schizophrenia	+		Experiencing+	–	–	(Factor Alpha)
Machiavellianism	+			–	(–)	Factor Beta
Self Monitoring–Global	(–)			(–)	(–)	
Family Problems	+			+	+	
Customer Service	–			+	+	
Integrity	–			+	+	
Stress Tolerance	–			+	+	
Unforgiving	+			Compassion–		
Volatile Aggression	Volatility+			Lack of Aggression–		
Trust	–			+		
Secure from Social Pressures	–			–		
Micromanaging	+				+	
Self-Control	–				+	
Self-Transcendence		+	+	+		
Risk Taking		+	+		–	
Mischievous		Sensation Seeking+	(Experiencing+)		–	
Quiet Achiever		–	(+)		+	
Openness to Emotions		+	+			
Hedonism		Enthusiasm+	Experiencing+			
Input Seeking		Dominance–		+		Cautiousness+
Warmth		+		+		
Compassionate and Sociable		Sociability+		Compassion+		
Grandiosity/Intimidation				–		
Ambition		+				
Sales Potential		+				
		Assertiveness+			+	Industriousness+, Cautiousness–
Ambitious Risk Taking						Achievement+, Cautiousness–
Acting Without Thinking		Sensation Seeking+				Cautiousness–

	Factor Alpha— Sociability— (+)	Factor Beta— Order— (+)	Factor Gamma— Industriousness— (+)
Restrained Expression	—	—	—
Rigid Introversion	—	—	—
Psychopathy—Secondary	—	—	—
Data Rational	Intellect+	—	—
Tolerance	+	+	—
Independent of Conventions and Others	+	—	—
Creative Personality	Non Traditional+	—	—
Exploration for Perfection	—	—	—
Industrious Curiosity	Intellect+	—	—
Judging/Perceiving	—	—	—
Routine	Variety Seeking—	—	—
Cold Efficiency	—	—	—
Rugged Individualism	—	—	—
Proving Self	—	—	—

Note: Parentheses indicate suspected or inconsistently observed contributions.

Table 13.3 Personality constructs and definitions

<i>Construct</i>	<i>Definition</i>
General Factor of Personality	The General Factor of Personality indicates general self-evaluation reflected in self-reports of personality. It is a common factor that includes variance from all Big Five traits, as well as Factor Alpha and Factor Beta. It is related to self esteem as well as intra- and inter-personal integration.
Global Evaluation-Negative Valence Aspect	Combination of personality traits generally viewed as undesirable.
Global Evaluation-Positive Valence Aspect	Combination of personality traits generally viewed as desirable.
Factor Alpha (Stability, Socialization, Integration)	Factor Alpha reflects individual differences in adjustment to functioning as part of human society or 'the need to maintain a stable organization of psychosocial function' (DeYoung, 2006, p. 1149). It is referred to as Socialization by Digman (1997) and Stability by DeYoung. Factor Alpha is a higher order personality trait that is defined by the shared variance among Emotional Stability, Agreeableness, and Conscientiousness. According to DeYoung (2006), as part of the Stability meta-trait, 'An absence of Neuroticism reflects emotional stability. Agreeableness reflects the tendency to maintain stability in social relationships. Conscientiousness appears to reflect motivational stability, the tendency to set goals and work toward them in a reliable and organized manner' (p. 1149). The low pole of Factor Alpha tends to indicate antisocial tendencies.
Factor Alpha–School Facet	Differences in adjustment to functioning within a larger human group, specifically in school settings.
Factor Beta (Plasticity, Exploration)	Factor Beta reflects individual differences in the 'need to explore and incorporate novel information' (DeYoung, 2006, p. 1149). Also termed Plasticity, it is a higher order personality trait that is defined by the shared variance between Extraversion and Openness. It, 'reflects the tendency to explore the world perceptually and cognitively' (DeYoung, 2006, p. 1149).
Neuroticism	Neuroticism refers to a domain of traits relating to tendencies to experience negative emotions. Individuals scoring high on this Big Five factor are easily frustrated, stress intolerant, and emotionally reactive. Global Neuroticism describes the degree of emotional dysregulation and maladjustment experienced by the individual.
Neuroticism-Volatility Aspect	This aspect of Neuroticism has been described as 'emotional lability, irritability or anger, and difficulty controlling emotional impulses' (DeYoung, Quilty, & Peterson, 2007, p. 885). Measures were included here if they assessed the trait directly or tapped into multiple facets relating to the aspect such as irritability, anger, agitation, and uneven temper.
Neuroticism-Withdrawal Aspect	This aspect of Neuroticism has been described as 'susceptibility to a class of negative affect that has commonly been described as withdrawal' (DeYoung et al. 2007, p. 885). Measures were included here if they assessed the trait directly or tapped into multiple facets relating to the aspect such as anxiety, depression, loneliness, and vulnerability. The Withdrawal construct here related here entails negative affect.
Neuroticism–Anxiety Facet	Describes individual differences in experiencing unreasonable worry, tension, and apprehension. Further specification of the anxiety facet has been accomplished by specifying the focus of the anxiety (e.g., tests), see below.
Neuroticism–Anxiety Facet—Academic/School Sub-Facet	Describes individual differences in experiencing unreasonable worry, tension, and apprehension in academic/school situations.

Neuroticism–Anxiety Facet—Facilitating Sub-Facet	Describes individual differences in the degree to which experiencing reasonable worry, tension, and apprehension helps an individual to perform better.
Neuroticism–Anxiety Facet—Mathematics Sub-Facet	Describes individual differences in experiencing unreasonable worry, tension, and apprehension related to mathematics.
Neuroticism–Anxiety Facet—Public Speaking Sub-Facet	Describes individual differences in experiencing unreasonable worry, tension, and apprehension related to public speaking.
Neuroticism–Anxiety Facet—Separation Sub-Facet	Describes individual differences in experiencing unreasonable worry, tension, and apprehension related to moving apart.
Neuroticism–Anxiety Facet—Social Sub-Facet	Describes individual differences in experiencing unreasonable worry, tension, and apprehension related to social situations.
Neuroticism–Anxiety Facet—Test Sub-Facet	Describes individual differences in experiencing unreasonable worry, tension, and apprehension related to tests.
Neuroticism–Anxiety Facet—Writing Sub-Facet	Describes individual differences in experiencing unreasonable worry, tension, and apprehension related to writing.
Neuroticism–Depression Facet	Refers to individual differences in the degree to which a person experiences depressive affect and feelings of sadness, hopelessness, and loneliness.
Neuroticism–Negative Affect Facet	Negative affect is the core trait that anchors the Neuroticism factor. It refers to stable individual differences in the tendency to experience negative emotions, agitation, and perturbation. Although Negative Affect measures could have been appropriately included among Global Neuroticism measures, they were kept separate to provide for multiple ways of evaluating the Neuroticism factor.
<i>Neuroticism–Perseveration Facet</i>	‘Persistence at tasks or in a particular way of doing things long after the behavior has ceased to be functional or effective; continuance of the same behavior despite repeated failures or clear reasons for stopping’. May represent the extreme, maladaptive pole of Persistence (see Conscientiousness), which leads this facet to fit better with Neuroticism measures (American Psychiatric Association, 2013, p. 779).
Neuroticism–Somatic Complaints Facet	Tendency to experience and/or be more sensitive to bodily pains, deficiencies, and issues.
<i>Neuroticism–Suspiciousness Facet</i>	Refers to individual differences in being envious and jealous as well as skeptical, or cynical about the nature of people’s intentions and behaviors. The opposite pole describes the tendency to believe that most people are good, trustworthy, and well-intentioned. This construct could have been grouped with Compound-Trust, however, Suspiciousness scales refer to affect, emotions, and feelings whereas Trust is more interpersonally focused, so we kept these constructs separate.
Neuroticism–Uneven Tempered Facet	Tendency to experience uneven temper, anger, frustration, and irritability. The opposite pole of this facet describes individual differences in the degree of calmness, dispassionateness, and deliberateness experienced.
Agreeableness	Agreeableness refers to a domain of personality traits that describe behavioral tendencies in getting along with others. It involves ‘the general tendency to be likable, friendly, nurturing, interpersonally sensitive, sincere, eager to be liked by others and to fit in, to get along, etc.’ (Davies, 2014). Measures classified under this construct include direct measures of the global Agreeableness factor as well as measures that represent multiple aspects and/or facets of Agreeableness.

(Continued)

Table 13.3 Personality constructs and definitions (continued)

<i>Construct</i>	<i>Definition</i>
Agreeableness-Compassion Aspect	This aspect of Agreeableness has been defined as 'compassionate emotional affiliation with others: (e.g., Warmth, Sympathy, Tenderness)' (DeYoung, 2013). Shared variance across traits such as empathy, concern, and sympathy reflect the aspect. High scoring individuals express care about the well-being of others and are sensitive toward others' feelings and needs. They tend to be sincere, sympathetic, and forgiving.
Agreeableness-Politeness Aspect	This aspect reflects the 'more reasoned (or at least cognitively influenced) consideration of and respect for others' needs and desires' (DeYoung, 2013). Shared variance across traits such as compliance, morality, and selflessness define the aspect.
Agreeableness-Cooperation Facet	Refers to 'the tendency to prefer cooperation to competition, liking to work with others, being a team player, and striving for harmony' (Davies, 2014).
Agreeableness-Lack of Aggression Facet	The negative pole of the trait describes the 'Willingness and/or ability to express anger against others: interpersonal manifestation of internal anger resulting from inability to control it (high Neuroticism) or unwillingness to control it (low Conscientiousness). Wishes others ill, seeks to physically/verbally/emotionally harm others; strikes down rivals; vindictive rather than forgiving; desires to get even with others; spiteful; mean; angry. The key element is the interpersonal part (i.e., it involves willingness and/or ability to express anger against other people, not just feeling anger or directing anger at self or objects – for ex. punching a wall)' (Davies, 2014).
Agreeableness-Modesty Facet	Refers to the 'tendency to be humble; does not talk about personal successes; deference; accepting blame or inferior position to keep harmony' (Davies, 2014).
Agreeableness-Non Manipulative Facet	Refers to the tendency to refrain from deceptive behavior in dealing with others. Low scorers deceive, use, manipulate, or exploit others.
Agreeableness-Not Outspoken Facet	Uneasy about joining arguments or even sharing one's opinions, especially critical opinions that are likely to result in, instill, or elicit negative thoughts/emotions in others.
Agreeableness-Nurturance Facet	Describes 'the tendency to be helpful to others and responsive to others' needs; caring, kind, and considerate toward others; being supportive; being generous; doing things for others; helping the unfortunate; being selfless and altruistic; engaging in pro-social behavior' (Davies, 2014).
Agreeableness-Tender Mindedness Facet	Describes individual differences in being kind and sincere in interactions with others.
Conscientiousness	Conscientiousness refers to a domain of personality traits that describe the ways in which individuals self-regulate impulses to follow socially prescribed norms. According to John and Srivastava (1999), 'Conscientiousness refers to individual differences in the propensity to follow socially prescribed norms for impulse control, to be task- and goal-directed, to be playful, delay gratification, and follow norms and rules'. Global Conscientiousness describes individual differences in being disciplined, focused, tenacious, organized, and responsible. Measures were included in this factor if they directly tapped global Conscientiousness or if they assessed multiple aspects and/or facets of Conscientiousness.

Conscientiousness-Industriousness Aspect	This aspect of Conscientiousness has been described as a tendency to be industrious (DeYoung et al., 2007). It is a meso-level factor defined by the shared variance from traits such as hard working, ambitious, confident, and resourceful as well as self-disciplined and competent (DeYoung, 2013). Measures were included here if they assessed the trait directly or tapped into multiple facets relating to the aspect.
Conscientiousness-Orderliness Aspect	A meso-level factor defined by the shared variance from traits such as neatness, perfectionism, and punctuality (DeYoung, 2013). Individuals scoring high on the aspect may be described as precise, careful, disciplined, and organized. They are timely and prompt, prioritize, follow-through, and task-focused. Low scorers procrastinate and are disorganized. Measures were included in this aspect if they directly indexed this aspect or if they assessed an Orderliness homogenous item cluster that is not represented in the other Conscientiousness facets noted.
Conscientiousness—Achievement Facet	Describes individual differences in having high aspiration levels and working hard to achieve goals. Individuals scoring high on the facet work hard and derive satisfaction from accomplishing challenging goals. Measures that assessed specific, homogeneous item clusters (e.g., academic) are noted in the measures compendium in the appendix (available online at https://study.sagepub.com/psychology).
Conscientiousness—Achievement Facet—Test Sub-Facet	Describes individual differences in having high aspiration levels for and working hard to achieve goals on tests. Individuals scoring high on the facet work hard and derive satisfaction from accomplishing challenging goals, particularly in relation to tests.
Conscientiousness—Avoidance of Distraction Facet	Pattern of goal-focused behavior, including planning and completing tasks without being easily distracted by external stimuli; ease with which goal-oriented behavior is maintained in planning and performing tasks.
Conscientiousness—Cautiousness Facet	Refers to the tendency to think carefully before acting and avoid behaviors that violate rules or norms. High scorers are cautious and deliberate.
Conscientiousness—Cautiousness Facet—Dysfunctional Sub-Facet	Refers to the tendency to spend an inordinate amount of time or care in thinking before acting. High scorers are cautious and deliberate even when such pause is not warranted.
Conscientiousness—Cautiousness Facet—Functional Sub-Facet	Refers to the tendency to think carefully before acting, especially in situations that warrant such pause. High scorers are cautious and deliberate when such pause is warranted.
Conscientiousness—Dependability Facet	Describes individual differences in responsibility and dutifulness. High scoring individuals are aware of societal rules and tend to behave in agreed upon ways.
Conscientiousness—Dependability Facet—Formality Sub-Facet	Describes individual differences in responsibility and dutifulness, especially in terms of following rules of formality. High scoring individuals are aware of societal rules and tend to strictly behave in agreed upon ways.
Conscientiousness—Order Facet	Refers to the 'ability to plan and organize tasks and activities' (Roberts, Chernyshenko, Stark, & Goldberg, 2005). Individuals scoring high on this trait are meticulous, neat, organized, planful, and detail oriented.

(Continued)

Table 13.3 Personality constructs and definitions (continued)

<i>Construct</i>	<i>Definition</i>
Conscientiousness—Persistence Facet	Refers to individual differences in persevering under difficult conditions and having patience and not relenting when success is not achieved quickly. High scorers tend to work long hours and endure in the face of adversity in order to achieve goals. In recent literature this has been referred to as grit.
Conscientiousness—Procrastination Avoidance Facet	Tendency to complete tasks and goals early, on-time, or without delay.
Conscientiousness—Procrastination Avoidance Facet—Avoidance of Time Wasting Sub-Facet	Tendency to complete tasks and goals early, on-time, or without delay, with emphasis on the efficient use of time allotted.
Extraversion	
	Extraversion refers to a domain of traits characterized by behavioral engagement with the external world, particularly in the interpersonal arena. Measures that assessed the global factor of Extraversion or that combined items across multiple Extraversion facets were included here. Global Extraversion describes individual differences in liking and feeling comfortable amidst larger groups, being outgoing, active, and assertive as well as cheerful. Extraverted individuals are described as talkative, high-energy, sociable, fun-loving, and seekers of external stimulation.
Extraversion—Assertiveness Aspect	This aspect of Extraversion refers to agency as well taking initiative and is linked with emerging as a leader in interpersonal settings. It represents the overlap of activity and dominance and it incorporates behaviors that mobilize others to take action and are related to being persuasive.
Extraversion—Enthusiasm Aspect	The aspect describes the tendency to 'experience positive emotions associated with anticipation or enjoyment of reward' as well as 'positive emotion and outgoing friendliness or sociability' (DeYoung et al., 2007). This aspect of Extraversion brings together social (e.g., gregariousness) and affective (e.g., positive emotions) parts of Extraversion.
Extraversion—Activity Facet	Refers to individual differences in the tendency to be energetic. Individuals scoring high on this trait prefer staying busy and a fast-paced lifestyle. Low scoring individuals are more leisurely, though not necessarily lazy.
Extraversion—Activity Facet—Polychronicity Sub-Facet	Refers to individual differences in the tendency to be energetic and prefer simultaneous activities and sensory inputs/doing many things at once.
Extraversion—Activity Facet—Tempo Sub-Facet	Refers to individual differences in the tendency to be energetic, specifically the tempo or pace of an individual's behaviors.
Extraversion—Dislike Working Alone Sub-Facet	Preference for working with others rather than alone.
Extraversion—Dominance Facet	Describes individual differences in being dominant, forceful, and socially ascendant/potent. Individuals who score high on this trait are self-assured, adopt active roles in groups, and prefer to lead rather than follow.
Extraversion—Dominance Facet—Directing Others Sub-Facet	Describes individual differences in being dominant, forceful, and socially ascendant, with a specific tendency to lead others.
<i>Extraversion—Lack of Anhedonia Facet</i>	Negative pole represents maladaptive lack of 'enjoyment from, engagement in, or energy for life's experiences; deficits in the capacity to feel pleasure or take interest in things' (American Psychiatric Association, 2013, p. 766). Indicates impairment in feeling pleasure or being interested in things.
Extraversion—Positive Emotionality Facet	Describes individual differences in experiencing positive emotions such as happiness, joy, love, zest, and excitement. High scoring individuals are cheerful, exuberant, and high-spirited.

Extraversion–Sensation Seeking Facet	Describes the tendency to seek out and even crave adventure, excitement, and stimulation. Individuals scoring high on this trait are spontaneous and venturesome. Low scorers tend to prefer predictability and safer experiences. Care should be taken to distinguish this construct from lack of Cautiousness (see Conscientiousness facet), which has elements of violating rules and norms, whereas that is not the core of this construct, seeking experiential sensations and excitement is. Enjoys witnessing and participating in dangerous situations.
Extraversion–Sensation Seeking Facet—Likes Dangerous Predicaments Sub-Facet	
Extraversion–Sociability Facet	Refers to the tendency to be outgoing, seek the company of others, and engage in social situations. High scorers are often gregarious and tend to have a high desire for interpersonal interaction and enjoy other people's company.
Extraversion–Sociability Facet—University Environment Sub-Facet	Tendency to seek the company of others and engage in social situations within the university context.
Extraversion–Social Withdrawal (reverse) Facet	Even though this construct is a part of the Sociability facet, it likely represents a different range of the construct and has been frequently measured from its negative pole. Thus, it was kept separate from the Sociability construct to enable the emergence of potentially differential relations. Individuals high on Social Withdrawal are uncomfortable in social interactions and typically withdraw from these interactions. They show little interest in others or in interacting with them.
Openness	Openness refers to a domain of personality traits that describes individual differences in cognitive exploration and stimulation. According to Connelly, Ones, Davies, & Birkland (2014), 'The central element to Openness is a desire to think and understand problems. Individuals seek out new experiences, are curious, liberal and independent minded, have artistic or scientific interests, are moved by aesthetics, and are introspective about emotions and behavior'.
Openness–Experiencing Aspect	This aspect captures the joint variance from aestheticism, fantasy, and imagination (DeYoung, 2013). It involves absorption in aesthetic and artistic experiences, sensation and perception, and fantasy. Measures were included here if they assessed the trait directly or tapped into multiple facets relating to the aspect.
Openness–Intellect Aspect	This aspect captures the joint variance from ingenuity, quickness, and intellectual engagement (DeYoung, 2013). It reflects both perceived intelligence and intellectual engagement. It can be thought of as individual differences in engaging with abstract information. Measures were included here if they assessed the trait directly or tapped into multiple facets relating to the aspect.
Openness–Aesthetics Facet	Tendency to appreciate artwork, music, natural beauty, and, 'be strongly moved by these aesthetic or artistic aspects' (Connolly et al., 2014). High scoring individuals 'genuinely appreciate various forms of art such as paintings, classical music, buildings, and landscapes, whereas those scoring low on this facet show low disinterest or indifference toward art' (Woo, Chernyshenko, Longley, Zhang, Chiu, & Stark, 2014).
Openness–Curiosity Facet	Desire to know, seek, and explore new things.
Openness–Fantasy Facet	Tendency to have an active fantasy life and might often day-dream.

(Continued)

Table 13.3 Personality constructs and definitions (continued)

<i>Construct</i>	<i>Definition</i>
Openness—Ideas Facet	Tendency to engage with and manipulate information. ‘Exploring many areas of knowledge; synthesis of ideas, verifiable generalization and logical thought to satisfy intellectual curiosity’ (von Stumm & Ackerman, 2013).
Openness—Introspection Facet	Reflects individual differences in ‘reflectiveness, meditativeness, observing others, preference for thinking over overt activity, and philosophical inclination’ (von Stumm & Ackerman, 2013). Connolly et al. (2014) described this facet as ‘Likes to think about and tries to understand the reasons for others’ or one’s own behavior; likes to predict how others will act’.
Openness—Need For Cognition Facet	Refers to a trait reflecting a preference for understanding complex topics and ideas (von Stumm & Ackerman, 2013). Individuals scoring high on the trait may be described as having a wide variety of interests and a desire to engage and understand one’s world.
Openness—Need For Cognition Facet—Complexity Sub-Facet	Preference for understanding topics and ideas, especially complex ones.
Openness—Non Traditional Facet	This facet indicates a ‘readiness to reexamine traditional social, religious, and political concepts’ (von Stumm & Ackerman, 2013) as well as conventional values, authoritarianism, and dogmatism.
Openness—Non Traditional Facet—Advocates Morality (reverse) Sub-Facet	Willingness to reconsider traditional or established ideas, with an emphasis on openness toward social, moral, and legal rules.
Openness—Variety Seeking Facet	This facet involves seeking out cognitive/mental change (cf. behavioral/sensory variety and stimulation, which are more related to Sensation Seeking, see Extraversion). Individuals scoring high on this facet prefer variety and are receptive to change. It reflects a desire to engage with unfamiliar experiences and novel activities.
Compound Traits	
Achievement via Independence	The negative pole indicates the tendency to be driven to achieve goals and objectives in unstructured situations that allow individual freedom and initiative rather than require the following of standard operating procedures or rules.
Acting Without Thinking	The negative pole indicates the tendency to be serious, responsible, and in control of one’s impulses and actions.
Ambition	Tendency toward prosocial interpersonal dominance, initiative-taking, and strong will in pursuit of goals. High scoring individuals strive to do better than others and enjoy competition.
Ambition—Cold Calling Facet	Describes a personality compound of high Conscientiousness and high Extraversion. It refers to prosocial interpersonal dominance and strength of will in pursuit of goals. High scoring individuals strive to do better than others and enjoy competition but are also adept at sociably persuading others.
Ambitious Risk Taking	Tendency to pursue dangerous, unnecessary, and risky activities without regard for consequences. Lack of concern for self-damaging situations or behavior, with reckless pursuit of goals, regardless of risks involved.
Borderline Personality Disorder	Pattern of struggling to regulate emotions and consequently to be volatile, impulsive, and have a distorted and often low self-image.
Cold Efficiency	A rigid focus on principles, rationality, and discipline with little regard for any human costs such focus may incur.
Compassionate and Sociable	Tendency to seek input from others, be concerned about others’ well-being, be outgoing, and be oriented to teamwork.

Creative Personality	Individual differences in proclivity toward (rather than capability for) innovative behavior. Measures are typically criterion keyed for indicating creative potential.
Customer Service	Scales linked to this construct were keyed to the criterion of customer service. Although the ingredients indicate these scales measure Factor Alpha, they have a somewhat greater emphasis on Agreeableness.
Data Rational	Preference for and comfort with focusing on data, numbers, figures, and other factual information rather than opinions and feelings.
Emotional Intelligence	Trait-based measures of emotional intelligence combine personality traits related to recognizing, understanding, and controlling emotions within oneself and others. As the ingredients of this compound indicate, measures of trait-based emotional intelligence may also be indicators of the General Factor of Personality.
Emotional Intelligence—Describing Emotions Facet	Combination of personality traits related to recognizing and describing one's emotions.
Exploration for Perfection	Exploration fueled by intellectual openness combined with a drive to fully understand things or find the best solutions.
Family Problems	Having feelings of disrespect, coldness, and/or apathy with one's family; reporting family conflicts and discord.
Generalized Self Efficacy	Tendency to believe, across tasks, domains, and contexts, in one's capability to produce given attainments (e.g., succeed and accomplish tasks).
Grandiosity/Intimidation	'Believing that one is superior to others and deserves special treatment; self-centeredness; feelings of entitlement; condescension toward others' (American Psychiatric Association, 2013, p. 780).
Hedonism	Tendency to value and seek enjoyment, excitement, and various pleasures.
Hysteria	Tendency to perceive psychological stress as physical symptoms; manifest shallow, mercurial emotions; and display dramatic and/or attention-seeking behavior.
Independent of Conventions and Others	Characterized by a desire to be free, self-sufficient, independent-minded, individualistic, and autonomous; not tied to people or places.
Industrious Curiosity	Driven to seek knowledge and take action in order to achieve understanding about a broad variety of topics.
Innovation	Tendency to seek, engage, and thrive in novel solutions; prefer synthesizing information and often form unorthodox ideas.
Input Seeking	Tendency to consult others and seek input when making decisions.
Integrity	Individual differences in honesty and trustworthiness. Behaviorally, individuals of high integrity adhere to societal standards of ethical conduct and avoid illegal or immoral activities. They are also often described as virtuous. Measures of Integrity assess Factor Alpha but place a somewhat greater emphasis on Conscientiousness.
Integrity—Overt Facet	Refers to the measurement of integrity using theft and counterproductivity related attitude items. These measures have also been referred to as 'clear-purpose tests' (Sackett & Harris, 1984).

(Continued)

Table 13.3 Personality constructs and definitions (continued)

<i>Construct</i>	<i>Definition</i>
Interpersonal Sensitivity	Sensitivity to the emotions of others. 'The tendency to be sensitive others' moods, emotions; socially sensitive; tactful, diplomatic, empathic, and sympathetic' Davies (2014). The strongest component of this compound is Extraversion.
Intellectual and Confident	Tendency to be interested in ideas and intellectual pursuits and feel optimistic about and confident in displaying one's abilities.
Judging/Perceiving	Preference for structure and planning versus flexibility and adaptability; desire for definiteness and absolutism.
Locus of Control (External)	Tendency to believe that what happens to one is beyond one's control (external locus of control). Internal locus of control refers to a tendency to believe that one has greater control over what happens to oneself.
Locus of Control (External)—Chance Facet	Belief that outcomes one experiences are due to chance.
Locus of Control (External)—Powerful Others Facet	Belief that outcomes one experiences are due to other individuals and organizations who hold power.
Locus of Control (Internal)—Academic/School Facet	Belief that one can influence events and their outcomes in an academic setting.
Locus of Control (Internal)—Bad Events Facet	Belief that one could have influenced the occurrence of bad events and their outcomes.
Locus of Control (Internal)—Bad Events Facet—Task Sub-Facet	Belief that one could have influenced the occurrence of bad events and their outcomes in a task scenario.
Locus of Control (Internal)—Health Sub-Facet	Belief that one can influence the health of oneself or others.
Locus of Control (Internal)—Task Facet	Belief that one can influence performance on or the outcome of a task.
Machiavellianism	Cynical disregard for norms regarding right and wrong combined with the use of deceit to pursue personal gains.
Managerial Potential	Tendency to provide fair and emotionally stable leadership. Scales assessing Managerial Potential are typically criterion keyed, but they tend to measure the personality traits indicated.
Micromanaging	Neurotically driven tendency to closely monitor others and ensure they accomplish goals and minor objectives in a specified way.
Micromanaging—Self Facet	Neurotically driven self-monitoring of goal pursuit and productive behavior.
Mischievous	Tendency to be charming but also act without thinking or regard for rules and commitments.
Mischievous—Playing Jokes on Other People Facet	Tendency to be charming but also act without thinking or regard for rules and commitments, specifically when playing jokes on others.
Narcissism	Proclivity toward self-centered admiration as well as a desire to demonstrate and build upon that image. 'Preoccupation with grandiose fantasies of self-importance, a need for admiration, and a lack of empathy' (American Psychiatric Association, 2000, p. 717). Indicates tendency to be arrogant, exploitative, and entitled.

Openness to Emotions	Tendency to be aware of, interpret, and express one's inner feelings and emotional experiences.
Optimism	General tendency to ascribe positive attributions to events and people.
Passive Aggressive	Tendency to be superficially pleasant toward others, even while resenting and/or resisting their requests.
Pragmatic	Tendency to focus on practical actions and outcomes rather than abstract ideas and thinking.
Present Focused	Tendency to be unburdened by past experiences or regrets and to be unworried about the future.
Proving Self	Desire to demonstrate and validate one's value to others.
Psychopathy—Primary Facet	Tendency to lack empathy and fear; weak behavioral inhibition.
Psychopathy—Secondary Facet	Tendency toward antisocial behavior, stress reactivity, and worry/guilt; strong behavioral activation.
Quiet Achiever	Tendency to be introverted and focused on achievement and learning/intellectual pursuits.
Resourcefulness	Preference for solving challenging problems using persistence, planning, and novel thinking.
Restrained Expression	Tendency to be serious, responsible, and in control of one's impulses and expressions.
Rigid Introversion	Unyielding preference for social privateness and solitude.
Risk Taking	Proclivity to downplay hazards and engage with uncertain ventures.
Routine	Desire for predictable, orderly, and controlled daily experiences; reduced interest in variety.
Routine Seeking	Tendency to search for routines in thoughts as well as activities.
Rugged Individualism	Tendency to embody stereotypically male traits, such as competitive, adventurous, bold, and independent. Preference for cognitive and behavioral exploration, and willingness to put forth effort in pursuit goals.
Rumination	Repeatedly thinking about, mentally simulating, and evaluating events and actions.
Sales Potential	Combination of traits related to being assertive, sociable, ambitious, and persuasive. Scales assessing Sales Potential are typically criterion keyed, but they tend to measure the personality traits indicated.
Sales Potential—Closing Facet	Combination of traits related to being assertive, sociable, ambitious, and persuasive, specifically in relation to getting others to make a commitment. Scales assessing the Closing facet of Sales Potential are typically criterion keyed, but they tend to measure the personality traits indicated.
Schizophrenia	Tendency to exhibit, 'a wide range of culturally incongruent odd, eccentric, or unusual behaviors and cognitions, including both process (e.g., perception, dissociation) and content (e.g., beliefs) Belief that one has unusual abilities, such as mind reading, telekinesis, thought-action fusion, unusual experiences of reality, including hallucination-like experiences' (Dilchert, Ones, & Krueger, 2014). Schizophrenia is also associated with social alienation, difficulties in concentration, and lack of impulse control.
Secure from Social Pressures	Proclivity toward high level of independent thinking and autonomy in actions across various situations. Low regard given to others' praise or disapproval.

(Continued)

Table 13.3 Personality constructs and definitions (continued)

<i>Construct</i>	<i>Definition</i>
Self Control	Refers to a compound personality trait that ranges from restraint to reactivity, behaviorally and emotionally. High scoring individuals tend to more easily restrain their behaviors and reactions.
Self Control–Cognitive Facet	Refers to a compound personality trait that ranges from cognitive restraint to reactivity.
Self Efficacy–Academic/School Facet	Tendency to believe in one's capability to produce given attainments within academic contexts.
Self Efficacy–Academic/School Facet—Language Sub-Facet	Tendency to believe in one's language capabilities to produce given attainments in academic situations.
Self Efficacy–Academic/School Facet—Mathematics Sub-Facet	Tendency to believe in one's mathematics capabilities to produce given attainments in academic situations.
Self Efficacy–Academic/School Facet—Science Sub-Facet	Tendency to believe in one's science capabilities to produce given attainments in academic situations.
Self Efficacy–Academic/School Facet—Test Sub-Facet	Tendency to believe in one's capability to produce given attainments on tests in academic situations.
Self Efficacy–Career Facet	Tendency to believe in one's capability to produce given attainments related to one's career.
Self Efficacy–Clerical Facet	Tendency to believe in one's clerical capabilities to produce given attainments.
Self Efficacy–Cognitive Facet	Tendency to believe in one's cognitive capabilities to produce given attainments.
Self Efficacy–Cognitive Facet—Mathematics Sub-Facet	Tendency to believe in one's capability to complete cognitive tasks emphasizing mathematical knowledge, skills, and abilities.
Self Efficacy–Cognitive Facet—Memory Sub-Facet	Tendency to believe in one's capability to complete cognitive tasks emphasizing memory skills and abilities.
Self Efficacy–Cognitive Facet—Reasoning Sub-Facet	Tendency to believe in one's capability to complete cognitive tasks emphasizing reasoning skills and abilities.
Self Efficacy–Cognitive Facet—Spatial Sub-Facet	Tendency to believe in one's capability to complete cognitive tasks emphasizing spatial skills and abilities.
Self Efficacy–Cognitive Facet—Verbal Sub-Facet	Tendency to believe in one's capability to complete cognitive tasks emphasizing verbal knowledge, skills, and abilities.
Self Efficacy–Cognitive Facet—Verbal Sub-Facet—Reading	Tendency to believe in one's capability to complete cognitive tasks emphasizing reading knowledge, skills, and abilities.
Self Efficacy–Cognitive Facet—Verbal Sub-Facet—Writing	Tendency to believe in one's capability to complete cognitive tasks emphasizing writing knowledge, skills, and abilities.
Self Efficacy–Cognitive Task Facet	Tendency to believe in one's capability to complete cognitive tasks.
Self Efficacy–Communication Facet	Tendency to believe in one's communication capabilities to produce given attainments.
Self Efficacy–Creativity Facet	Tendency to believe in one's creativity capabilities to produce given attainments.
Self Efficacy–Diversity Facet	Tendency to believe in one's capability to produce given attainments related to diversity.

Self Efficacy—Interests Facet	Tendency to believe in one's capability to produce given attainments related to several occupational interests.
Self Efficacy—Interpersonal Facet	Tendency to believe in one's interpersonal capabilities to produce given attainments.
Self Efficacy—Intuition Facet	Tendency to believe in one's intuition to produce given attainments.
Self Efficacy—Mechanical Facet	Tendency to believe in one's mechanical capabilities to produce given attainments.
Self Efficacy—Miscellaneous Facet	Tendency to believe, across tasks, domains, and contexts, in one's capability to produce given attainments (e.g., succeed and accomplish tasks) in a variety of settings and pursuits. A miscellaneous set of self efficacy measures that did not fit into other constructs went into this category.
Self Efficacy—Occupational Facet	Tendency to believe in one's capability to produce given attainments related to one's occupation.
Self Efficacy—Occupational Facet—Cognitive Sub-Facet	Tendency to believe in one's capability to produce given attainments emphasizing knowledge, skills, and abilities related to one's occupation.
Self Efficacy—Occupational Facet—Counseling Sub-Facet	Tendency to believe in one's capability to produce given attainments related to one's occupation as a counselor.
Self Efficacy—Occupational Facet—Counseling Sub-Facet—Open Mindedness	Tendency to believe in one's capability to produce given attainments related to being open-minded in one's occupation as a counselor.
Self Efficacy—Self Management Facet	Tendency to believe in one's self-management capabilities to produce given attainments.
Self Efficacy—Sexual Facet	Tendency to believe in one's capability to produce given attainments related to sexuality.
Self Efficacy—Stress Resistance Facet	Tendency to believe in one's capability to handle strain.
Self Efficacy—Task Facet	Tendency to believe in one's capability to complete tasks.
Self Efficacy—Work Facet—Adaptability Sub-Facet	Tendency to believe in one's capability to adapt within the work context tasks.
Self Esteem	Degree of self-confidence, self-assurance, self-worth, and lack of feelings of inferiority experienced by an individual. The core of this trait is lack of Neuroticism.
Self Esteem—Accepting of One's Weaknesses Facet	Satisfaction with oneself regardless of deficiencies and even if others do not share that esteem.
Self Monitoring—Global	Willingness and ability to engage in the expressive control of public self-presentations.
Self Monitoring—Other Directedness Facet	Tendency and willingness to use pretense and deception to change behavior to suit others.
Self Transcendence	Feelings of connection to and existence within a broader context and power than oneself.
Social Suave	Pendant for and ease in joining social situations, connecting with others, and entertaining others.
Stress Tolerance	Tendency to handle pressure well and not experience anxiety and tension in stressful conditions. Measures of Stress Tolerance assess Factor Alpha but place a somewhat greater emphasis on lack of Neuroticism.
Superstitiousness	Predisposition to believe in supernatural links between certain things and purported outcomes.
Superstitiousness—Formal Facet	Predisposition to believe in common supernatural links between certain things and purported outcomes.

(Continued)

Table 13.3 Personality constructs and definitions (continued)

<i>Construct</i>	<i>Definition</i>
Superstitiousness–Personal Facet	Predisposition to believe in personal, supernatural links between certain things and purported outcomes.
Tolerance	Tendency to be broad-minded and appreciate differences in others' values; freedom from prejudice (Connelly et al., 2014).
Trust	Individual differences in degree to which an individual will trust others and not question their motives. Low scorers on the trait tend to assume that others are dishonest or dangerous.
Type A	Tendency toward being competitive, aggressive, impatient, and ambitious.
Unforgiving	Tendency to bitterly ruminate on past events and to hold and apply grudges.
Volatile Aggression	Exhibits mean or vengeful behavior with little provocation and experiences regular or frequent angry feelings, though most of the time these feelings are over-controlled.
Warmth	Tendency to be affiliative, affectionate, and outwardly friendly. Low scorers are described as cool, aloof, and detached.
Social Desirability	
Social Desirability	Pattern of response distortion that results in endorsement of items perceived to be favored by one's society. Refers to the tendency to respond to personality items in a way that will create a positive impression on others.
Impression Management Facet	Tendency to actively and knowingly misrepresent oneself and endorse items that produce a favorable perception.
Impression Management Facet–Unlikely Virtues Sub-Facet	Tendency to actively and knowingly endorse items that produce a favorable perception, especially in regards to unlikely virtues.
Self Deception Facet	Tendency to unconsciously endorse items that produce a favorable perception of oneself and reflect delusional self-perception.
Denies Common Frailties Sub-Facet	Tendency to (unrealistically) deny having any common frailties.
Response Set	
Response Set	Pattern of responding indicative of erratic, inattentive, unusual, or other response sets.
Acquiescence Facet	Tendency to agree, rather than disagree, with items regardless of their content.
Central Tendency Facet	Tendency to endorse neutral or 'Don't Know/Not Applicable' responses, regardless of item content.
Communality Facet	Tendency to endorse beliefs and behaviors that occur very frequently in normative samples.
Inconsistency Facet	Responding to similar questions differently or opposite questions similarly.
Infrequency Facet	Tendency to endorse beliefs and behaviors that occur very infrequently in normative samples.
Nay Saying Facet	Tendency to disagree, rather than agree, with items regardless of their content.
Negative Impression Facet	Tendency to endorse items that produce an unfavorable perception.
Random Response Facet	Tendency to respond in an inconsistent and erratic way.

Note: Ordered according to Figure 13.2 with additional traits defined that appear in the compendium; italics indicate constructs with consistent loadings on other Big Five factors.

Compendium of Self-Report Personality Scales: Mapping Personality Measures to Constructs

The identification of which measures assess which personality constructs is typically limited to construct-validity evidence associated with particular personality measures. Cross-inventory examinations are helpful (Roberts et al., 2005; DeYoung et al., 2007; Woo et al., 2014; Woods & Anderson, 2016; and Credé, Harms, Blacksmith, & Wood, 2016), but by their very nature cannot be exhaustive (e.g., only so many inventories can be completed by the same sample of individuals). Although factor analyses based on meta-analytic matrices of many measures (see Viswesvaran & Ones, 1995) can potentially provide a robust methodology to identify clusters of measures assessing the same personality construct, such an approach has yet to be attempted. Based on our knowledge of the number of potential personality measures involved, this approach may not ever be feasible: there are thousands of personality scales.

Drawing correct conclusions from previous research requires knowing which personality measures assess which constructs. Selecting appropriate measures for future studies and applications requires knowledge of potential measures that could be utilized. To assist in this enterprise, we aimed to identify measures of constructs included in the Pan-Hierarchical Five Factor taxonomy described above and defined in Table 13.3.

Previously meta-analysts utilizing measures from multiple personality inventories had attempted to identify measures of constructs based on subject matter expert judgments (e.g., Barrick & Mount, 1991). Recognizing deficiencies, potential biases, and simply the limits on knowledge and information capabilities of experts, we used the nomological-net web clustering approach described above to place measures into measure compilations for each personality construct defined in Table 13.3. No subject matter expert has full knowledge of thousands of personality measures. Furthermore, convergent and divergent validity are ultimately empirical questions. A similar, though less extensive, approach was taken by Hough and Ones (2001) when they presented a compilation of measures that assessed constructs included in their working taxonomy of personality traits.

Similar to our compilation of cognitive ability measures, we began building on the Hough and Ones (2001) mappings of personality to constructs in 2009 when the first author of this chapter began to work on meta-analyses of personality and cognitive ability relations. The number of measures to be linked to personality constructs was enormous.

We were dismayed to see many authors blindly using scales that were traditionally used in their literatures without much thought to construct coverage or similarity to/differences from other measures that may have been more appropriate for their research questions. Another disappointment was authors believing that they were covering the entire personality construct domain by using a particular inventory.

To reiterate, personality is a hierarchical domain with complex structure. No single personality inventory covers all levels of the hierarchy or all Big Five pure and compound personality constructs. Some measures do an excellent job of covering the Big Five personality factors (Big Five Inventory; John, Donahue, & Kentle, 1991), others include a reasonably representative set of facets (e.g., NEO Personality Inventory; Costa & McCrae, 1992b), yet others provide robust coverage at the aspect level (e.g., Big Five Aspect Scales; DeYoung et al., 2007). Some include measures from the Big Five domain that are particularly valuable for assessing personality at work (Hogan Personality Inventory; Hogan & Hogan, 2007). Others assess an amalgam of Big Five factors, facets, and compounds (HEXACO; Lee & Ashton, 2004). Frankly, regarded with the taxonomic lens presented in this chapter, some debates in the literature about whether there are five or more dimensions of personality border on pointless (Ashton et al., 2004). There are over 200 well-defined personality constructs that have been identified. Their measures can be located by using their Big Five relations as coordinates. Ultimately, modeling all personality measures requires operating in multidimensional space with special attention to differential relations with external (i.e., non-personality scale) variables and criteria.

In linking specific personality scales to personality constructs, each measure's items and definitions, as well as quantitative evidence (primarily factor analytic and convergent/divergent ability findings), were examined to the extent they were available. We tried to leverage meta-analytic syntheses to the extent possible. One major group of meta-analyses that guided this effort were cross-inventory examinations and integrations of personality measures. This series of recent meta-analyses aimed to identify each Big Five construct's pure facets (i.e., facets that primarily load on only one of the Big Five global factors) and compound facets (i.e., blended personality constructs that load onto more than one Big Five factor [Connelly, Davies, Ones, & Birkland, 2008; Connelly & Ones, 2008; Connelly et al., 2014; Davies, 2014; Davies et al., 2009]). They were especially valuable because they were taxonomically comprehensive and based on hundreds of studies and thousands of

individuals. The findings from these investigations facilitated the task of mapping personality measures to constructs since meta-analytic factor analysis results were reported for many of the personality assessments in the current meta-analytic database. Nevertheless, in all scale categorizations we sought converging lines of evidence, and the perspectives provided by these studies were juxtaposed with independent perspectives provided by other quantitative reviews of personality, including those by Roberts et al. (2004) and Roberts et al. (2005) for Conscientiousness, Woo et al. (2014) for Openness and its facets, DeYoung et al. (2007) for the aspects of the Big Five, Whiteside and Lynam (2001) for sensation seeking as well as impulsivity, and Markon et al. (2005) for pathological traits/extreme parts of the trait continua. Beyond published research, the linking of scales to personality constructs also relied on examinations of scale items, joint factor analyses with well-understood Big Five inventories, as well as information about the nomological net of each measure. Buros *Mental Measurements Yearbooks* and personality inventory manuals also provided useful information.

Each personality measure was assigned to a personality construct by the current authors. Classification of scales that were particularly difficult to classify, especially in distinguishing between aspect- and facet-level personality measures, benefited from the input of Dr. Colin DeYoung as well as other personality experts (e.g., Drs. Auke Tellegen, Robert Krueger, Brian Connelly, Steve Stark, Sasha Cheryneshenko, Greg Manley).⁸ In many cases, we also contacted inventory creators or researchers to seek information that was not readily discernable from research we were utilizing to establish the constructs measured by particular measures. These efforts produced an initial compendium that was used in the first author's dissertation (Stanek, 2014). Since then, additional measures were identified for inclusion in the compendium and previous classifications were reviewed again by both authors and outside experts. The same process described above was used to link each scale to the personality constructs they assessed.

Our compendium of personality measures is presented in Appendix B (available online at <https://study.sagepub.com/psychology>). It is organized alphabetically by construct and the measures within each construct are alphabetized as well. Measures of compound personality traits, social desirability, and response sets are listed in separate sections at the end. Note that some measures indicate the reverse of a construct.

This compendium of personality measures can be used to interpret the extant personality literature in terms of the constructs assessed rather than

measures utilized. For most personality constructs, multiple scales measuring the trait were identified. Rather than guessing/assuming based on the name of the scale, researchers and practitioners can consult the compendium to identify personality measures commensurate with the constructs they wish to assess. Meta-analysts can utilize this compendium to group personality measures into construct categories for more powerful analyses.

One caveat for the personality domain that is different from the cognitive ability domain is that personality measures that assess the same construct tend to overlap less than tests that assess the same cognitive ability (Connelly & Ones, 2008; Connelly et al., 2008; Ones, 1993; Ones et al., 2005). Thus, given these lower convergent validities for personality constructs, the measures listed for each construct in the compendium should be understood to reflect a large amount of measure- (and inventory-) specific variance in addition to personality construct variance shared across similar measures. Item-level complexity of personality measures (e.g., circumplex representation at the item-level; e.g., DeGeest & Schmidt, 2015) might also contribute to the lack of overlap between personality measures assessing the same traits.

Selecting personality measures for use in research and practice requires careful attention regarding which specific personality constructs need to be assessed to answer one's research question or fulfill one's application needs. Clearer understanding/intent should lead to greater precision in selecting which measures are used. For meta-analyses, the large number of personality constructs and measures reviewed here, however, should not be interpreted as requiring hyper-specific segregation of measures/constructs, and as a result, splintered literatures leading to paralysis in building cumulative science. Rather, the meaning of measures grouped together for meta-analyses should be carefully considered. For example, it may be acceptable to group all Extraversion global factor, facet, and compound measures under an Extraversion umbrella for meta-analytic purposes. The meaning of such an analysis is different than one that carefully distinguishes different constructs of the Extraversion family of traits. In the former case, the meta-analytic results would apply to Extraversion constructs broadly defined (i.e., Extraversion family of traits). In the latter case, meta-analytic estimates would tie effects under consideration to particular Extraversion-related constructs.

The compendium presented in Appendix B (available online at <https://study.sagepub.com/psychology>) should leave little doubt that scale names are highly unreliable indicators of which personality constructs are assessed. In each measure,

we also came to the conclusion that there is high variability in the veracity of scale descriptions provided by authors and even by technical manuals. Most useful were large N reports of their nomological nets, either in primary studies or in meta-analyses, alongside scale items. We encourage researchers and practitioners utilizing personality measures to carefully examine item content, as well as the convergent and divergent validities, of scales they utilize to better understand the psychological meaning that is shared across scale items.

Personality measure compilations by other researchers in the recent literature, (e.g., Woods & Anderson, 2016; Credé et al., 2016) largely align with our mappings, but do not include as many measures, samples, constructs, or levels of the personality space. We are also mindful that investigations based on any single sample are prone to sampling error, as well as over-fitting of personality variance specific to that sample. Nonetheless, we expect any discrepancies between measures and constructs presented in this chapter and other compilations to be addressed by meta-analyses using multiple measures and multiple samples.

Naturally, just like the cognitive ability tests compendium presented in this chapter, the compendium of personality measures is open for revision and updates as well. Additions and proposed revisions should be sent to the lead author, along with documents (e.g., items, scale descriptions, etc.) and data prompting the proposal.

CONCLUSION

This chapter presented updated taxonomies for two key domains of individual differences used in IWO psychology: cognitive ability and personality. We expect and hope that additional insights and research will continue to refine both taxonomies. The structures we have presented are constantly evolving according to new evidence, and we suggest that theorists, researchers, and practitioners should strive to use the most up-to-date, empirically validated structures in designing, collecting, analyzing, and discussing their data. Forming taxonomies is an inductive exercise that requires more diverse sources of input to yield robust and generalizable results. Taxonomies are most useful when they consider an entire construct space en masse. This is what sets apart the efforts described in this chapter from taxonomies postulated based on myopic examinations of a single sample, country, inventory, approach, or field of study.

The taxonomies and constructs presented here should help organize research, identify new

hypotheses, and suggest new processes for how traits and measures relate to each other and outcomes. The compendia we presented should help IWO psychologists understand and leverage measures well-suited to the constructs they intend to assess.

We hope that the updated, open taxonomies we have presented in this chapter will be stable enough for IWO psychologists to state and apply what they know; flexible enough to accommodate what they learn; independent of any specific theory about how cognitive abilities and personality characteristics develop, yet reflective of empirical findings; compatible with CHC and Hierarchical Five Factor models, but not slaves to them; specific enough for precise communication, but general enough to reflect consensual conclusions. As open systems, both the taxonomies and the compendia must evolve and develop as new data and findings require their update. We invite other IWO psychologists to join us in this enterprise by sending us data and measures to inform revisions.

Notes

- 1 Some constructs (e.g., olfactory abilities) were not included since the current authors did not encounter any measures that were good indicators of these constructs in the non-pathological, adult samples examined.
- 2 It must also be noted that part of the reason that a high degree of uniformity of factor structures is observed may be the high degree of general environmental uniformities, such as schooling practices and common, core curricula (Anastasi, 1954, p. 528).
- 3 It should be noted that several psychomotor, kinesthetic, and olfactory ability dimensions were also omitted from this chapter (e.g., Speed of Limb Movement, Olfactory Memory, Tactile Sensitivity, Arm-Hand Steadiness, and Control Precision).
- 4 Dashes are used to separate constructs at different levels of the hierarchy. For example, Fluid-Induction indicates that Fluid is a higher order ability and Induction is a specific ability that constitutes a sub-branch of this node.
- 5 Traits here are meant to refer to enduring patterns of behavior; 'a pattern of relationships within the individual's behavior' (Anastasi, 1954, p. 525), rather than single or inconsistently occurring behaviors.
- 6 See Dilchert, Ones, Van Rooy, & Viswesvaran, 2006, for the history, description, and scientific as well as applied utility of the Big Five. See Connelly, Ones, and Hülshager (Chapter 12, this *Handbook*) for descriptions of the Big Five, their cybernetic and psychosocial functions, as well as

their utility in IWO psychology theories, explanations, and prediction.

- 7 Dashes are used to indicate level of the construct hierarchy. For example, aspects are only one dash removed from their Big Five trait. Facets are two dashes removed from their Big Five trait. Sub-Facets are three dashes removed from their Big Five trait.
- 8 Although we greatly benefited from and appreciated the input of these experts, their willingness to provide input should not necessarily be seen as an endorsement of the views expressed in this chapter.

ACKNOWLEDGMENTS

A predecessor to the material contained in this chapter was included as part of the first author's doctoral dissertation. Authors' views and opinions expressed in this work are their own and do not necessarily reflect the views, ideas, or values of their employers/affiliations.

We thank Kevin McGrew and Colin DeYoung for helping us sort through difficult-to-classify measures of cognitive ability and personality, respectively. We also thank Brenton Wiernik and Stephan Dilchert for providing measures to be included. The second author thanks Adib Birkland, Brian Connelly, Stacy Davies, Stephan Dilchert, Jack Kostal, Ben Seltzer, and Mike Wilmot for helping her better understand specific cognitive or personality construct domains through their research, dissertations, and meta-analyses conducted under her supervision.

We also thank Taryn Ibach for her editorial assistance in compiling this chapter.

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Work Preferences: Vocational Interests and Values

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INTRODUCTION

Measures of individual preferences have a long history in applied psychology. Vocational interest scales were among the first psychological assessments developed by applied psychologists (Parsons, 1909), and their relationships with ability, other personality traits, and career outcomes have been perennial questions (Folsom, 1917; Hartman & Dashiell, 1919; May, Hartshorne, & Welty, 1927). For much of the life of applied psychology, vocational interest measures were regarded as extremely important for diagnosing and predicting workplace outcomes, and interest measures were readily applied in both vocational counseling and work psychology (Dawis, 1991). E. K. Strong, Jr. (1943, p. vii) even remarked ‘the developments with regard to the diagnostic meaning of interests would prove to be one of the great, if not the greatest, contributions to applied psychology’. However, as industrial, work, and organizational (IWO) psychology separated from counseling psychology in the 1980s (Erdheim, Zickar, & Yankelevich, 2007), research and application of vocational interests moved primarily to counseling psychology and to their relationships with career and vocational choice. Within IWO psychology, vocational interests virtually

disappeared. Other preference variables, such as work values and motives, did not disappear so completely from IWO research, especially as the fields of organizational culture and person-organization (P-O) fit grew in prominence, though the attention given to these constructs remains dwarfed by research on general personality traits.

However, IWO psychology has recently begun to experience a resurgence of interest in vocational interests and other preference variables. This resurgence has come amidst increasingly positive results of research on various forms of person-environment fit (Kristof-Brown, Zimmerman, & Johnson, 2005), as well as several meta-analyses showing strong relationships between vocational interests and a variety of outcomes, including withdrawal, academic performance, work performance, and job and career satisfaction (Nye, Su, Rounds, & Drasgow, 2012, 2017; Van Iddekinge, Roth, Putka, & Lanivich, 2011). In this chapter, we review research on individual preferences at work, including their conceptualization, assessment, and relationships with other constructs. We highlight the theoretical and empirical contributions of preferences to organizational science and opportunities for future research to enhance our understanding of workplace phenomena and the practice of applied psychology.

DEFINITIONS

Generally, we define *work preferences* to be ‘enduring individual differences in attraction to or liking of particular aspects of work’. Though interests and values have been the most frequently studied work preferences, a wide variety of other labels have been used to describe work preferences, including beliefs, attitudes, motives, needs, goals, commitments, career orientations, and career anchors. Unfortunately, establishing a common lexicon to describe work preferences has been difficult, as various authors have used the same terms to refer to constructs with wildly different definitions and levels of abstraction. For example, Super (1973) placed ‘needs’ at the most abstract level in his motivational hierarchy, whereas Dawis and Lofquist (1984) defined ‘needs’ as the most specific attitudinal construct.

We regard the important distinction among these various constructs to be whether they reflect individual differences in preferences for *activities* or individual differences in preferences for *outcomes*. Vocational interests are individuals’ *characteristic patterns of preferences for certain work activities and work environments*. Interests are described in terms of how appealing or engaging an individual finds certain activities (e.g., writing), topics (e.g., science), environments (e.g., outdoors), or ways of working (e.g., alone vs. in a team). Conversely, work values are individuals’ *characteristic pattern of preferences for certain work outcomes, goals, or objectives*. Work values reflect differences in the importance individuals ascribe to the various rewards, psychological states, relationships, or conditions that work can provide (Dawis, 1991; Super, 1980). Work values also reflect the standards by which individuals evaluate activities and goals – what outcomes need to be provided by an activity for it to be worthwhile? Outside of applied psychology, the term ‘work values’ is also used to refer to other concepts, such as business ethics or following societal norms (Dose, 1997).

Though definitions of interests and work values have been diverse, most of the divergence reflects differences in theoretical propositions (e.g., interests ‘motivate goal-oriented behaviors and orient individuals toward certain environments’; Rounds & Su, 2014, p. 98), rather than differences in core conceptualizations. The distinction between interests as preferences for activities or contexts and values as preferences for outcomes captures the essential features of nearly all definitions. Other preference constructs, such as needs (Dawis & Lofquist, 1984), motives (Bilsky & Schwartz, 2008), work styles (e.g., preference for polychronicity; Bluedorn, Kalliath, Strube, & Martin, 1999;

preference for teamwork; Shaw, Duffy, & Stark, 2000), and career anchors (Schein, 1993) can be similarly distinguished by whether they reflect preferences for activities/contexts or outcomes. Though there is obvious overlap (i.e., certain activities are more likely to provide certain rewards), the distinction between preferences for activities and preferences for outcomes is useful for organizing measures and research in this domain.

Trait Interests vs. State Interest

In IWO and counseling psychology, interests are conceptualized as dispositional trait preferences for work and leisure activities (Dik & Hansen, 2008). In contrast, in affect and educational research, interest is typically thought of as a positive, high activation emotional state wherein individuals express attention and concentration, experience feelings of immersion and engagement, and engage in a variety of exploratory behaviors (Silvia, 2008). In education, evoking student interest has been found to be important for increasing students’ intrinsic motivation and learning (Ainley, Hidi, & Berndorff, 2002; Renninger & Hidi, 2011), and repeated experiences of state interest in a topic tend to develop over time into trait-like dispositional interests (Hidi & Renninger, 2006; Krapp, 2002). Recent work on the social neuroscientific basis of vocational interests also has connected vocational interests with the positive affective system, with interpersonal interests being especially strongly associated with positive emotionality and general approach temperament (Hansen, Sullivan, & Luciana, 2011). Interests thus appear to reflect individual differences in both cognitive evaluations (Lent, Brown, & Hackett, 1994) and emotional functioning. Dispositional vocational interests likely reflect patterns of state (emotional) interest in different work activities, similar to conceptualizations of personality traits as probabilistic distributions of state behavior (Fleeson, 2001); Henn (2010) presented preliminary evidence supporting this perspective.

HISTORICAL OVERVIEW

Vocational Interests

Vocational interests have been one of the most frequently studied constructs in vocational psychology for over a century. Consideration of individuals’ interests began following World War I, as educators

and industry started to recognize that matching individuals' interests to work activities and environments could improve student and worker outcomes. Many psychologists who worked on ability and personality assessment during the war later became active in the development of interest inventories. During the Great Depression, federal funding provided support for interest studies to promote job placement. The role of interest assessment in the career decision-making process became even more important following World War II when colleges and universities created career counseling services for veterans who were supported by the G.I. Bill (Hansen, 2013a).

Major development of interest inventories began in earnest in 1919 when Clarence S. Yoakem taught a seminar at the Carnegie Institute of Technology. This seminar created a 1,000-item pool that served as the foundation for several interest inventories. One of those early efforts, the Strong Vocational Interest Blank (Strong, 1927), has been revised repeatedly and continues to be a popular choice for interest assessment in a wide range of settings. Strong's inventory quickly dominated interest research and remained the most frequently used instrument until Holland's theory and corresponding instrument, the Self-Directed Search, gained popularity in the 1980s.

Early work by Strong and others was largely atheoretical. Their work focused on distinguishing the interests of people in different occupations, developing inventories to measure interests, and designing interventions to help individuals maximize interest-based person-environment fit. Holland's Theory of Vocational Personality Types emerged in the 1980s as a major unifying force in interest research (Holland, 1973). The vast majority of subsequent studies on vocational interests have depended heavily on Holland's theory, especially the hypothesized RIASEC order of interests, though this focus has been heavily criticized (Tinsley, 2000a, b).

When interest inventories were first developed, they were used for research and application in many contexts and for a variety of purposes, including both career counseling and personnel selection and management. In the 1980s, however, the growing divide between IWO and counseling psychology resulted in vocational interest measures being used most often in high school and college counseling settings. Recent trends in research and practice have widened these applications. Interest inventories are seeing increasing use in organizational career coaching and development programs for mid-career changes and retirement planning, as well as in counseling for traditionally underserved populations. Consideration of vocational interests in human resource management

also has increased following recent meta-analyses showing substantial criterion-related validity for job performance (Nye et al., 2012; Van Iddekinge, Roth et al., 2011; cf. Ingerick & Rumsey, 2014; Mandelke, Shoenfelt, & Brown, 2016).

Work Values

Four research literatures on work values have developed in parallel with little interaction. Within vocational psychology, the concept of work values emerged out of the behaviorist tradition to describe individual differences in the psychological reinforcers that motivate individuals to act in the workplace. Early work on values and needs was based on Spranger's (1928) conceptualization of six values – aesthetic, economic, political, religious, social, and theoretical – and Allport and Vernon's (1931) empirical effort to measure them. Current conceptualizations of work values are also heavily influenced by early motivation theories, especially Murray's (1938) needs-press theory. Work values were incorporated into several prominent theories of vocational development (Brown, 2002; Dawis & Lofquist, 1984; Super, 1980), but largely fell out of fashion in the late 1980s, though this area is presently experiencing a resurgence of interest among counseling researchers and practitioners (Leuty & Hansen, 2011). Work values from this tradition are similar to the concepts of work ethics, needs, and orientations toward work; these concepts differ primarily in their level of specificity (Pryor, 1982). More recently proposed concepts from organizational behavior and management research, such as career anchors (Schein, 2010) and career orientations (Briscoe & Hall, 2006; Drenzo, Greenhaus, & Weer, 2015; Rodrigues, Guest, & Budjanovcanin, 2013), are also work values of the kind considered in vocational psychology, but these constructs have often been studied without reference to earlier work values research (see also Wiernik & Wille, 2018, in *Managerial Psychology and Organizational Approaches* volume, Ones et al., 2018, Chapter 24).

In basic personality and cultural psychology, a general consensus on a universal structure of personal and cultural values has emerged (Gouveia, Milfont, & Guerra, 2014; Schwartz, 1992; Schwartz & Bilsky, 1987), and some researchers have conceptualized work values as contextualized expressions of general personal values (Ralston, Holt, Terpstra, & Yu, 2008; Ralston, Pounder, Lo, Wong, Egri, & Stauffer, 2006; Ros, Schwartz, & Surkiss, 1999; Schwartz, 1999).

Work values also have been examined in studies of organizational culture and climate (see Ashkanasy & Dorris, 2018, in *Managerial*

Psychology and Organizational Approaches volume, Ones et al., 2018, Chapter 9). Within this tradition, individual and organizational values are conceptualized as key drivers of person-organization fit and its associated outcomes (Chatman, 1989; O'Reilly, Chatman, & Caldwell, 1991). Research in this area began in earnest in the 1980s and has developed continuously to the present.

Finally, the term 'values' has been used in management research to refer to ethical business practices and attitudes (Agle & Caldwell, 1999). This conceptualization of work values is distinct from those used in applied psychology and organizational behavior research, though business ethics and some work values are related (Berings & Adriaenssens, 2012).

PLACEMENT OF INTERESTS AND VALUES IN CAREER THEORIES

Vocational interests and work values feature prominently to one degree or another in virtually all theories of career choice and development, though the relative focus on these and other constructs varies greatly across theories. For example, Holland's (1997) Theory of Vocational Personality Types places primary emphasis on vocational interests, whereas Dawis and Lofquist's (1984) Theory of Work Adjustment focuses more extensively on values, abilities, and characteristics they label as personality (e.g., styles, celerity, pace, rhythm, and endurance). Below, we briefly discuss the role of interests and values in several major career theories. For more discussion on the propositions and empirical support for theories of career development and management, see Wiernik and Wille (2018, in *Managerial Psychology and Organizational Approaches* volume, Ones et al., 2018, Chapter 24).

Holland's Theory of Vocational Personality Types

Holland's (1973, 1984, 1997) theory is one of the most popular and prominent in career counseling research and practice. In large part, the popularity of Holland's theory can be attributed to its parsimony and the extensive attention Holland and colleagues gave to developing tools for applying the tenets of the theory in counseling settings (Nauta, 2010). Holland's theory focuses on vocational interests and their impact on individual choices and outcomes. Holland hypothesized that interests fell into six types – Realistic, Investigative, Artistic,

Social, Enterprising, and Conventional (RIASEC) – arranged in a circular or hexagonal structure (See Table 14.1 and Figure 14.1). Holland classified both individuals and environments according to which of these interest types were most prominent. Holland made strong predictions about the relationships among interest types (see 'Structure of Interests', below) and predicted that a match between an individual's interest type and the features of their work environment (*congruence*) would result in a variety of positive occupational outcomes. Holland also hypothesized that other features of an individual's interest profile, such as the degree to which one interest dimension is most prominent (*differentiation*) and the degree to which their strongest interests are close together on the hexagon (*consistency*), would have an impact on work outcomes, though these propositions have received little empirical support (Nauta, 2010).

Holland considered interests to be expressions of personality and incorporated aspects of personality traits, work values, skills, and abilities into his definitions and measures of interest dimensions. This catch-all conceptualization of interests has led to substantial excess meaning being attached to various dimensions of interests (e.g., the Realistic dimension is assumed to encompass a variety of stereotypically male traits, such as introversion, emotional detachment, and conservatism, rather than merely interest in hands-on mechanical activities; Valian, 2014). Modest relationships among these domains support conceptualizing and measuring them separately (Hansen, 2013b).

Theory of work adjustment

The Minnesota Theory of Work Adjustment (TWA; Dawis & Lofquist, 1984; Dawis, 2005) emphasizes the role of work values play in driving job satisfaction and tenure. Like Holland's theory, TWA is a person-environment fit (P-E fit) theory and predicts that person and job characteristics interact to produce work outcomes. Correspondence between an individual's work values and the reinforcers supplied by the job results in satisfaction, and correspondence between a job's requirements and an individual's skills and abilities results in *satisfactoriness* (effective performance). TWA predicts that when an individual is both satisfied and satisfactory, they are likely to remain in a position. Conversely, when there is a mismatch between individual needs and job supplies or between job requirements and individual abilities, individuals are predicted to become dissatisfied and turnover. TWA also includes an adjustment process model that describes how individuals and organizations

attempt to rectify misfit before turnover results. This process model includes both adjustment mechanisms, such as individuals attempting to change job reinforcers or develop new skills, as well as individual differences that moderate the mechanisms, such as individuals' capacity to tolerate misfit (*flexibility*) and patience to endure unsuccessful adjustment (*perseverance*).

TWA focuses on six values – Achievement, Altruism, Autonomy, Comfort, Safety, and Status – as well as more specific facets, called *needs*. Interests do not play a prominent role in original conceptualizations of TWA, though some efforts have been made by other authors (e.g., Lubinski & Benbow, 2000; Ton & Hansen, 2001) to integrate interests into the TWA model to create a more integrative theory of the interaction between individual preferences and environmental characteristics.

Super's Developmental Models

While preferences occupy a central role in Holland's theory and the Theory of Work Adjustment, they are less prominent in other career theories. Donald Super's (1957) Career Development Theory and its revisions, Vocational Development Self-Concept Theory (Super, 1963) and Life-Span, Life-Space Theory (Super, 1980), focuses on the stages individuals go through as they create a career and integrate work roles with other life roles. The central construct in Super's theories is *career maturity*, which refers to an individual's capacity to explore career options and make effective decisions and plans about career paths to pursue. Interests, values, and abilities play an important role in the formation of a person's vocational identity or self-concept, which has an impact on the careers they explore and the developmental experiences they pursue. In Super's models, preferences are thus most important in the early stages of growth and exploration as an individual determines the general direction their career will take.

Social Cognitive Career Theory

Social Cognitive Career Theory (SCCT; Lent et al., 1994; Lent, 2013) evolved out of Bandura's Social Cognitive Theory. Its central constructs are *self-efficacy beliefs* and *outcome expectations* that are shaped by learning experiences. Similar to Super's theory, SCCT incorporates interests, values, and abilities as constructs that help to determine the career path an individual pursues. SCCT's interest model hypothesizes that interests form as a result of self-efficacy beliefs

(i.e., self-assessments of capability to perform a particular activity) and outcome expectations (i.e., imagined positive outcomes of engaging in an activity). If self-efficacy and outcome expectations are positive, then interest develops. As interests develop, they work in tandem with self-efficacy and outcome expectations to mold an individual's goals and intentions to participate in an activity. As individuals engage in different activities, they develop relevant skills that lead to further goal attainment and increased self-efficacy and outcome expectations for those activities. SCCT also posits that abilities and values contribute to interest development. Abilities influence interests by increasing self-efficacy for different activities. Values are linked to interests through outcome expectations (i.e., values determine which positive outcomes are attended to in an individual's interest-relevant outcome expectations). Within SCCT's model of career choice, interests, self-efficacy, outcome expectations, and skills all contribute to the careers individuals decide to pursue. Environmental pressures and influences from culture and family also are posited to have an impact on career choices, potentially reducing the impact of interests on these decisions (Lent, 2013).

Whether interests and values occupy a central or peripheral role in a theory, a common element across all of these career theories is that preferences are expected to primarily influence individuals' initial career choices and their satisfaction in their chosen careers. Relatively little attention is given by these theories to explaining how preferences influence individual performance within a job. This trend reflects the focus of vocational and counseling psychology on work outcomes relevant primarily to individuals rather than to organizations. A major need for future research in IWO psychology is deeper integration of preference constructs into general models of work behavior and job performance (cf. Rounds & Su, 2014).

STRUCTURE OF INTERESTS AND VALUES

Structure of Interests

Interest dimensions – RIASEC and the interest circumplex

A taxonomy of vocational interest domain constructs compiled from over 100 interest inventories is presented in Table 14.1. Constructs in this table reflect interest in broad classes of activities that share similar psychological features and experiences, even if the included activities themselves are heterogeneous. For example, Enterprising interests encompass a variety of activities

Table 14.1 Taxonomy of common vocational interest dimensions

<i>Dimension</i>	<i>Preference for...</i>	<i>Example scales</i>	<i>Holland's (1997) definition:</i>
Realistic	Practical, hands-on, and concrete activities with physical objects; includes Technical, Outdoor, and Adventuring components	SDS Realistic; UNIACT Technical; CISS Producing	Preference for explicit, ordered, or systematic manipulation of objects, tools, machines, and animals; Aversion to educational or therapeutic activities; Manual, mechanical, and athletic skill; Asocial, inflexible, straightforward, practical, and unsightful; Value tradition, independence, power, and money
Investigative	Rational and systematic reasoning and working with facts, data, and abstract concepts; includes science, research, analysis, and other complex intellectual activities	SDS Investigative; SI1 Investigative; CISS Analyzing; PGI Nature/Outdoors	Preference for observational, symbolic, systematic, and creative investigation of physical, biological, and cultural phenomena; Aversion to persuasive, social, and repetitive activities; Ability to organize and analyze data and abstract ideas; Curious, rational, unpopular, pessimistic, and reserved; Value scholarly achievement and independence
Artistic	Expressing oneself creatively; includes creating physical art, creative performance, creative writing, and innovation activities	SDS Artistic; MVPI Aesthetic; CISS Creating; VISA Culture	Preference for ambiguous, free, unsystematized activities that entail the manipulation of physical, verbal, or human materials to create art; Aversion to explicit, systematic, and ordered activities; Skilled in music, art, acting, writing, and speaking; Complicated, disorderly, idealistic, impulsive, original, and sensitive; Value aesthetic qualities
Social	Helping and showing empathy toward others; includes personal service, medical service, social service, religious, and social science activities	SDS Social; MVPI Altruistic; COPS Service, skilled; UNIACT Social Service; CISS Helping	Preference for interacting with others to inform, train, develop, cure, or enlighten; Aversion to explicit, ordered, systematic activities involving materials, tools, or machines; Interpersonal skills; Sociable, patient, generous, idealistic, and responsible; Value altruism, equality, and moral values
Enterprising	Persuading people or exerting influence over others; includes sales, leadership, and competitive/aggressive activities	SDS Enterprising; BM1 Persuasive; CISS Influencing	Preference for manipulation of others to attain organizational goals or economic gain; Aversion to observational, symbolic, and systematic activities; Skills for leading and persuading others; Ambitious, aggressive, extraverted, adventurous, and popular; Value political and financial gain
Conventional	Organizing data, people, or physical environments; includes clerical tasks, business operations, financial tasks, and other highly structured activities	SDS Conventional; UNIACT Business Detail; CISS Organizing	Preference for explicit, ordered, systematic manipulation of data, such as keeping records or filing materials; Aversion to ambiguous, free, exploratory, or unsystematized activities; Clerical, numerical, and detail-oriented abilities; Careful, conforming, defensive, obedient, prudish, thrifty, and methodical; Value tradition, responsibility and comfort

(Continued)

Table 14.1 Taxonomy of common vocational interest dimensions (continued)

<i>Dimension</i>	<i>Preference for...</i>	<i>Example scales</i>	<i>Holland's (1997) definition:</i>
Data/Concrete [C/E]	Tasks involving concrete facts, records, files, and numbers	COII Routine(+) vs. Abstract/Creative(-); PGI Data	
Ideas/Abstract [I/A]	Tasks involving abstract concepts, knowledge, and creativity	KPR Ideas; PGI Ideas	
People [S]	Tasks involving interacting with others	PTOS People; PGI People	
Things [R]	Tasks involving physical materials, machines, or tools	PTOS Things; LTOII Manipulative	
Technical [R]	Hands-on activities and physical objects, specifically working with tools, machines, physical processes, and manual tasks	KPR Mechanical; PGI Mechanical; COPS Technical	
Outdoor [R]	Working with animals, nature, and agriculture, and in the outdoors	KPR Outdoor; VSA Environmental	
Domestic [R]	Food production, sewing and textiles, cleaning, and home economics activities; conceptualized as reflecting a more feminine form of Realistic interests	ACT VIP Household; COPS Consumer Economics	
Adventuring [R/E]	High-risk and physically challenging activities; includes athletics, military, law enforcement, and thrill-seeking activities	CISS Adventuring; SII Risk-Taking	
Computation [I/C]	Working with numbers; includes mathematics, computers, statistics, and financial activities	KPR Computational; COPS Computation; PGI Data Processing	
Biological [I/S]	Biological and medical sciences, including biology; conceptually a mixture of Outdoor, Investigative, and Social interests; includes biology and ecology research and medical and social science research and practice	SVIB [1943] Group I; ACT V/IP Health; TIS Biological Sciences	
Linguistic [A]	Words and verbal communication; includes creative, technical, and persuasive writing, editing, marketing, and translation	JCE Communicative; ORV/S Erudition; SVIB [1943] Group X	
Performance [A]	Creative interpersonal and physical activities; scales typically focus on musical activities, but may also include dance, acting, and other performance art	KPR Musical; BM Musical	

Facilitating [E/S]	Selling, serving, assisting, providing information and hospitality, coaching; conceptually a mixture of Enterprising/Social	PGI Social Facilitation; VISA Service
Business [E/C]	All aspects of business, including personal contact, management, and operations; conceptually a mixture of Enterprising/Conventional	MVPI Commercial; COPS Business

Note: Interest dimensions are defined exclusively in terms of preferences for particular kinds of work activities and environments. Descriptions of RIASEC dimensions based on Holland (1997) that incorporate other individual differences are provided for comparison. For non-RIASEC dimensions, the RIASEC domain(s) to which the construct is most closely related is shown in brackets.

SDS = Self-Directed Search; UNIACT = Unisex ACT Interest Inventory; CISS = Campbell Interest and Skill Survey; MVPI = Hogan Motives, Values, and Preferences Inventory; VISA = Vocational Interest Survey for Australia; COPS = California Occupational Preference System; BM = The Birkman Method; KPR = Kuder Preference Record; PGI = Personal Globe Inventory; ACT VIP = ACT Vocational Interest Profile; SII = Strong Interest Inventory; SVIB = Strong Vocational Interest Blank; JCE = Jackson Career Explorer; ORVIS = Oregon Vocational Interest Scales; JVIS = Jackson Vocational Interest Survey; PTOS = People-Things Orientation Scales; LTOII = Lee-Thorpe Occupational Interest Inventory; COII = Canadian Occupational Interest Inventory

Source: Adapted from Wiernik (2016b).

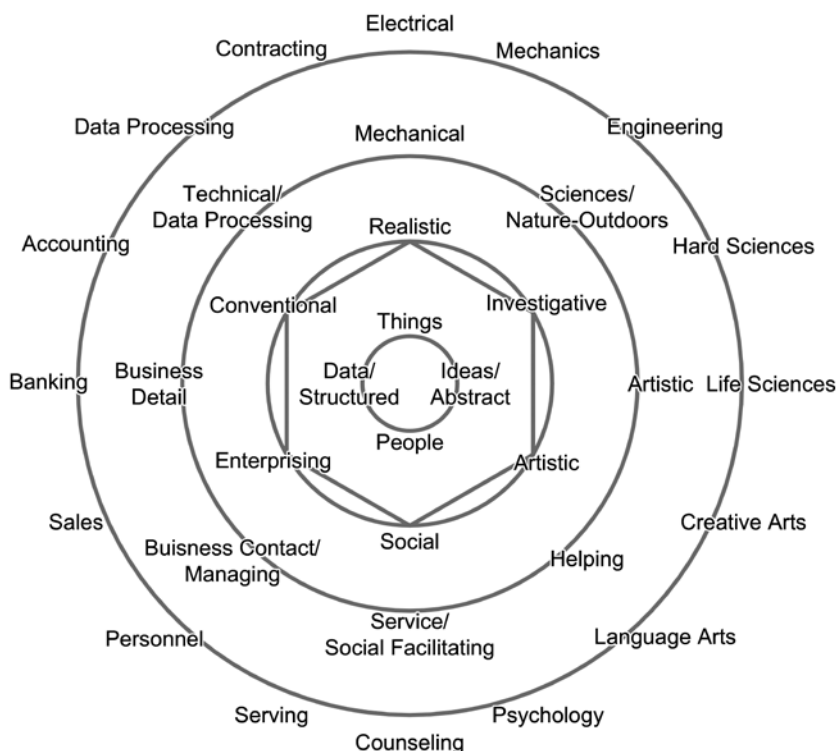


Figure 14.1 Circumplex models of vocational interest structure

Note: The concentric circles structure of interests presented by Tracey & Rounds (1995). In their model, interest factors are arranged around a circumplex anchored by Data, Ideas, People, and Things. The traditional six RIASEC factors are one possible set of interests that could be arranged around this circumplex. Also pictured are the 8 factors from Tracey and Rounds' (1996) IOP inventory and a selection of basic interests.

Source: Adapted from Tracey & Rounds (1995)

involving exerting influence over others, such as leadership, sales, management, and politics. These broad *interest domain* constructs are distinguished from narrower *basic interests* (homogeneous item clusters of interest in specific narrow sets of work tasks) or *occupational interests* (interest in specific occupations; see 'Narrow interest factors', below).

The vast majority of recent research on, and application of, vocational interests has focused on Holland's (1973, 1984, 1997) six-factor RIASEC model. Holland's model describes individuals' vocational interests as being a combination of six broad dimensions or types – Realistic, Investigative, Artistic, Social, Enterprising, and Conventional, collectively referred to as RIASEC (described in Table 14.1). Holland's model dominates the field of interests to such a degree that for many applied

psychologists, the interest domain is synonymous with RIASEC.

Holland's theory posits that these dimensions are arranged in a circumplex (typically called the 'hexagon'), shown in Figure 14.1. Dimensions close to each other on the hexagon are more strongly correlated with each other than dimensions on opposite sides. The circumplex arrangement of interests has been supported in a variety of settings and samples (Rounds & Tracey, 1996; Tracey & Rounds, 1993). However, the six RIASEC points are not spaced equidistantly around the circle (Holland & Gottfredson, 1992; Prediger, 2000; Tinsley, 2000a, b), and individual interest scales have unique variance not accounted for by the circumplex that can enhance validity if attended to in practice (Van Iddekinge, Putka, & Campbell, 2011).

Despite the prominence of the six RIASEC types and the hexagon structure, the various components of Holland's theory have not gone without criticism (Tinsley, 2000a). The RIASEC labels, especially Realistic, Conventional, and Social, have been criticized as uninformative and potentially offensive (Campbell, 1995; Valian, 2014). Campbell, Hyne, and Nilsen (2001) suggest that labels which focus on the activities of interest and their common psychological features, such as Producing, Organizing, and Helping, are preferable to the labels originally chosen by Holland. Additionally, many critics have argued that six dimensions represent an oversimplification of the construct space and that the RIASEC factors, especially Realistic, are too abstract and heterogeneous to usefully describe individual or occupational characteristics. A variety of alternative factor structures with more interest dimensions have been proposed in attempts to more completely and concretely describe the interest domain (e.g., Adkins & Kuder, 1940; Campbell, 1995; Gati, 1984; Guilford, Christensen, Bond, & Sutton, 1954; Jackson, 1977; Pozzebon, Visser, Ashton, Lee, & Goldberg, 2010; Roe, 1956; Tracey & Rounds, 1996). Many of these dimensions are described in Table 14.1. Tracey and Rounds (1995) suggested that any number of interest scales may be used to map the interest circumplex and argued that six dimensions may be too few to accurately capture the structure in diverse samples, offering their 8-dimensional structure as a more robust alternative. However, some interests (e.g., Adventuring) are poorly captured by a circumplex structure (Campbell, 1995), suggesting that even the circumplex may reflect an incomplete description of the vocational interest construct space.

Higher-order dimensions

Prediger (1982) characterized the interest circumplex using two dimensions – *Data–Ideas* and *People–Things*. These higher-order dimensions form two axes against which RIASEC and other interest dimensions can be plotted. In Prediger's model, People and Things interests are isomorphic with Social and Realistic interests, respectively; Data interests represent a point on the circumplex intermediate between Enterprising and Conventional, and Ideas represents a point intermediate between Artistic and Investigative. Most interest researchers have assumed that the axes of the interest circumplex constitute bipolar dimensions (i.e., interest dimensions on opposite sides of the circumplex are negatively correlated; Holland, 1973; Prediger, 1982). However, Tay, Su, and Rounds (2011) meta-analytically showed that the opposite ends of these dimensions are positively correlated (and only weakly negatively

correlated once the general factor of interests is controlled). Data, Ideas, People, and Things represent four points on the interest circumplex. They (as well as the RIASEC dimensions) should be conceptualized as relatively independent factors, rather than as mutually exclusive interests.

Additional higher-order dimensions of interests have been proposed, such as prestige (Tracey & Rounds, 1996), sex-type (Deng, Armstrong, & Rounds, 2007), and complexity (Gottfredson & Holland, 1996). Complexity and prestige have received the most research attention and appear to be essentially isomorphic (Prediger, 1996). Complexity has a longer history within applied psychology (Demarais & Sackett, 1993; Toker & Ackerman, 2012), is a more parsimonious explanation of the relationships among interest factors, and appears to represent the interaction of interests and general mental ability in the development of vocational preferences, rather than a third interest dimension.

The general factor of interests

A general factor accounts for a substantial amount of the variance in all interest inventories (Tay et al., 2011; Mount, Barrick, Scullen, & Rounds, 2005, referred to it as Factor γ to compare it to the higher-order personality traits Factor α and Factor β ; Digman, 1997). Historically, this factor was regarded as a systematic error or response artifact (Jackson, 1977; Prediger, 1982). However, the general interest factor shows conceptually meaningful relationships with other traits and is related strongly to Openness (especially the Intellect aspect), general self-efficacy, approach motivation, low depression, and, to a lesser extent, Extraversion and Conscientiousness (Ackerman & Heggestad, 1997; Bullock & Reardon, 2008; Hansen et al., 2011). Thus, the general factor has substantive meaning as an individual's breadth of interests, need to engage in activities that are liked, and general tendency to approach opportunity at work (Darcy & Tracey, 2003; Hansen et al., 2011; Mount et al., 2005).

Narrow interest factors

The RIASEC dimensions and similar interest constructs are broad factors that capture the general psychological features of activities individuals find engaging. This level of abstraction may limit the predictive validity of construct-based interest scales (Day & Rounds, 1997). Narrower interest facets, such as preferences for specific work activities (basic interests; e.g., writing, mathematics, animal care, counseling, supervision) or interest in specific jobs or occupations (e.g., chef, minister, physician, CEO), may provide more comprehensive and interpretable descriptions of individuals' interest

profiles. Basic and specific interest scales tend to show stronger relationships with college major and occupational choice (Campbell, Borgen, Eastes, Johansson, & Peterson, 1968; Ralston, Borgen, Rottinghaus, & Donnay, 2004) and job performance and turnover (Van Iddekinge, Roth et al., 2011). Armstrong, Smith, Donnay, and Rounds (2004) found that basic interests have a structure that is similar to the classic interest circumplex, but noted that occupational groups with similar basic interests often span multiple RIASEC types (e.g., various medical occupations share basic interests but belong to Realistic, Investigative, and Social categories). Basic and occupational interests appear to represent a combination of broad activity preferences (RIASEC and other interest domains) and other personal and environmental factors.

Structure of Work Values

Compared to interests, much less attention has been devoted to studying the structure of work values. Within the vocational psychology tradition of work values, narrative reviews (Berings, De Fruyt, & Bouwen, 2004; Rounds & Armstrong, 2005) and several multi-inventory factor analyses using diverse samples and instruments (Elizur, Borg, Hunt, & Beck, 1991; Elizur, 1984; Leuty & Hansen, 2011; Macnab & Fitzsimmons, 1987; Ros et al., 1999) have identified similar factors. Leuty and Hansen (2011) identified six factors underlying the scales of three prominent work values measures. These factors are described in Table 14.2.

Within the organizational culture tradition, individual work values have been primarily assessed using some form of Chatman and colleagues' Organizational Culture Profile (OCP; O'Reilly et al., 1991). This measure is used to assess values-based person-organization fit. The OCP includes a variety of values and cultural characteristics, many of which are not typically included in values measures from vocational psychology

(e.g., calm, aggressive). Despite these differences, the factors of the OCP are conceptually very similar to the factors identified by Leuty and Hansen (2011) and other vocational psychology researchers. The similar results across these studies using different measures, from different traditions, and separated in time is promising. Additional primary and meta-analytic research on the structure and construct validity of work values is needed. Particularly necessary is research integrating work values and similar constructs, such as career anchors and career orientation, from vocational psychology, organizational culture, and management/organizational behavior traditions.

Relationships between Interests and Values

The domains of vocational interests and work values are conceptually similar, and some measures of preferences do not distinguish them (Hogan & Hogan, 1996). However, only Social and Enterprising interests show consistent moderate relations with work values dimensions. Social interests appear to serve altruistic and relationship values, and Enterprising interests appear to serve influence and prestige values (Berings & Adriaenssens, 2012; Hirschi, 2008; Leuty & Hansen, 2013; Super, 1962). The small relationships between most work values and interest dimensions reflect that values are functional motives (Clary & Snyder, 1991); a variety of work activities may help employees achieve the same outcomes. To some degree, this small overlap may also be due to the ipsative nature of many work values measures (Dobson, Gardner, Metz, & Gore, 2014).

Stronger relationships have been found between vocational interests and personal values (i.e., the guiding principles and criteria individuals use to make choices in life; Schwartz, 1992). Similar to research on work values, Sagiv and colleagues have observed that Enterprising interests contribute to

Table 14.2 Common work values dimensions

<i>Dimension</i>	<i>The importance of...</i>
Environment	The working environment, including physical conditions, work–family balance, and job security
Achievement	Challenging work, opportunity for growth, goal achievement, and creativity
Status	Status, prestige, advancement, authority, power, and rewards
Autonomy	Independence, variety, and individual responsibility
Organizational Culture	Morality, fairness, management support, safety, training, and clear procedures
Relationships	Interpersonal relationships with coworkers and opportunities to help others

Note: Definitions are based on Leuty and Hansen (2011).

self-enhancement values and that Social interests serve benevolence values (Knafo & Sagiv, 2004; Sagiv, 2002). In addition, Conventional interests appear to support conservative values, whereas Investigative and Artistic interests support universalism and non-traditionalism values. This research suggests that while individuals may pursue the same work outcomes in many occupations, vocational choices represent a key way through which general life priorities are expressed.

ASSESSMENT OF INTERESTS AND WORK VALUES

Currently, vocational interests and values are most frequently assessed in educational or counseling settings, including vocational rehabilitation counseling. The products of these assessments – interest and values scores and profiles – can be used for a variety of purposes. Often, results are used to provide counseling clients and practitioners with objective information to guide educational and vocational exploration. Data from interest and values assessments provide practitioners with the information they need to develop hypotheses about their clients and, similarly, to provide clients with data to help them organize information about themselves and occupations. Interest and values assessments are also essential for understanding the match or mismatch between the person and the environment. This understanding helps clients to identify jobs, occupations, and organizations that fit them optimally. Less frequently, interest and values inventories have been applied in selection and staffing contexts (Hansen, 1994), though P-E fit based on these and similar constructs is frequently the target of interviews and other selection procedures (Sekiguchi & Huber, 2011). As personal and career coaching have emerged as services provided by organizational consulting firms, the sentiment for using interest and values assessments in IWO settings has increased (Mandelke et al., 2016). In the following section, we discuss several of the most prominent measures of vocational interests and values.

Interest Inventories

Since the introduction of the first interest inventories, many instruments have been developed. Three inventories stand out as the most frequently used with adult populations: the Self-Directed Search (Holland & Messer, 2013), the

Strong Interest Inventory (CPP, 2004), and the Campbell Interest and Skill Survey (Campbell et al., 2001). All three incorporate scales to measure the RIASEC interest dimensions. A key consideration in assessing work preferences in IWO contexts is that virtually all existing interest and values inventories have been developed for use in counseling applications or organizational research. Instruments developed for these purposes may not necessarily be optimally designed for other uses, such as personnel selection or classification. A scale which facilitates career exploration need not also predict performance within an occupation, and items which discriminate members of different occupations (the criterion by which most occupation-specific interest scales were constructed) need not discriminate high versus low performers within an occupation. Additionally, the situational factors influencing social desirability and impression management processes differ dramatically across counseling and selection contexts. Developing and validating interest inventories for selection contexts is a promising area for future research and practice.

Self-Directed Search (SDS)

The Self-Directed Search is a 228-item inventory available in both paper and computerized forms. The SDS was explicitly constructed by Holland to measure the six interest dimensions described in his theory, though the selection of items also was influenced heavily by empirical and factor analytic work on Holland's previous instrument, the Vocational Preference Inventory (VPI; Holland, 1975). The SDS contains five sections with different types of items: Activities (response is Like or Dislike), Occupational Titles (Yes or No response to 'The occupation is appealing'), Competencies (Yes or No 'I have performed well'), Skills (self-ratings of skills compared to others of the same age), and Daydreams (free response list of occupations that have been considered). Scale scores are computed by summing responses to items for each RIASEC dimension from the first four sections (i.e., excluding the Daydream section). The resulting raw scores then are rank-ordered to determine the three highest scale scores, and these scales become the person's Summary Code. This Summary Code is compared with the codes assigned to various occupations, college majors, and leisure activities to help individuals to identify activities that may fulfill their interests. Various specialty forms (e.g., forms for clients with limited reading skills and for clients experiencing career transitions) and translations in 25 languages have been developed. The SDS is extremely popular for use in counseling applications, and

its utility as a counseling intervention has been well-documented (Holland & Messer, 2013). However, its exclusive focus on Summary Codes at the expense of numeric interest dimension scores represents a substantial loss of information that may limit the predictive validity of standard SDS results for performance criteria in selection contexts, as well as the range of career possibilities considered in counseling and development contexts. Additionally, the inclusion of both interest items and self-ratings of skill raises questions about the construct validity of the SDS scales (see the discussion on the relationship between interests and vocational self-efficacy below).

Strong Interest Inventory (SII)

The Strong Interest Inventory was first published in 1927 by E. K. Strong, Jr. The original version, the Vocational Interest Blank (for Men), was developed using the empirical method of contrast groups (Strong, 1927). Interest scales for occupations were developed entirely based on items that discriminated members of the occupation from a heterogeneous 'Men-in-General' sample. Over the years, the Strong was revised to include a version for women (Strong, 1933), to add basic interest scales (Campbell et al., 1968), to add 'General Occupational Themes' representing RIASEC dimensions (Campbell & Holland, 1972; Hansen & Johansson, 1972), to merge the separate Women's and Men's forms into one inventory (Strong-Campbell Interest Inventory; Campbell, 1974), to expand the number of Occupational Scales in professional, nonprofessional, and vocational/technical occupations (Hansen & Campbell, 1985), and to modernize item and scale content for changing occupations, technologies, and economies (CPP, 2004; Herk & Thompson, 2012).

The current version of the SII Inventory (CPP, 2004; Herk & Thompson, 2012) includes 291 items that include five types of interest items: occupational titles, school subjects, work activities, leisure activities, and work style preferences, as well as some items that resemble standard personality inventory questions (called personal characteristics). Scores for the SII are reported for interest scales at several levels of specificity. The broadest scales are the six General Occupational Themes (GOT) that measure Holland's RIASEC types. The 30 Basic Interest Scales (BIS) represent the next level of specificity and assess interest in particular classes of work activities, such as writing or data analysis. They are related empirically to the General Occupational Themes. The Visual Arts & Design scale, for example, correlates with the Artistic GOT, and Entrepreneurship correlates with Enterprising. Most BIS are similar to facet

scales on Big Five personality inventories. The Occupational Scales (OS) are developed using the empirical method of contrast groups to distinguish members of 130 occupations from general population samples. The OS assess the extent to which an individual's interests are similar to satisfied members of each occupation. The OS are compound scales that assess composites of likes and dislikes relevant to a specific occupation. Among the SII scales, the Occupational Scales demonstrate the strongest relations with occupational entry and choice of college major (Hansen, 2013b).

The 2004 SII also includes five Personal Style Scales (PSS) that measure preferences for different styles of work that may be present in a variety of occupations. The Risk-Taking scale assesses willingness to take financial, physical, and social risks and to try new things (this scale essentially assesses the Adventuring interest domain). The Work Style (formerly called 'Extraversion') scale measures interests related to working with data, things, and ideas (low scores) versus with people (high scores). The Leadership Style scale, also strongly correlated with Extraversion measures, assesses interest in working alone (low scores) versus interest in leading and managing others (high scores). The Team Orientation scale captures an interest in working independently versus working collectively. Finally, the Learning Environment scale assesses interest in persisting in a formal academic environment.

Because the SII reports quantitative scores for a large number of interest scales, it is well-suited for correlational analyses typically used in performance criterion validation studies. Indeed, much of the research on the relationship between vocational interests and performance criteria has used some version of the Strong Interest Inventory (Van Iddekinge, Roth et al., 2011).

Campbell Interest and Skill Survey (CISS)

The Campbell Interest and Skill Survey (Campbell et al., 2001) was developed using scale construction methods similar to those for the Strong Interest Inventory. Like the SII, the CISS profile is composed of three sets of scales at different levels of specificity: seven Orientations Scales at the interest domain/RIASEC level of abstraction; 29 Basic Scales, and 60 Occupational Scales, plus three Special Scales, the Academic Focus scale, the Extraversion scale, and a Variety scale measuring the general factor of interests. Different from the SII, however, the CISS also includes Skill scales that are measures of career self-efficacy. The CISS reports separate scores for interest and self-rated skill for each of the Orientation, Basic,

Occupational, and Special scales. The seven Orientations are largely analogous to the RIASEC dimensions, though the Realistic dimension is separated into Producing (craftwork, mechanical, outdoor, and agricultural interests) and Adventuring (high-risk and athletic interests) scales, in line with other research identifying the Realistic dimension as especially heterogeneous in content (Tracey & Rounds, 1995).

Work Values Inventories

The assessment of values in IWO settings, and even in vocational counseling settings, typically comes fourth in frequency after ability, personality, and interest assessment. As a result, many fewer work values instruments have been developed than interest inventories. Three instruments have been well-validated and received extensive use. Two of these were developed in the vocational psychology tradition. The Minnesota Importance Questionnaire (MIQ; Rounds, Henly, Dawis, Lofquist, & Weiss, 1981) is one of the most widely used assessments of work values in both research and applied settings. The MIQ was developed as part of the research program designed to test the hypotheses of the Theory of Work Adjustment. The Work Values Inventory (Super, 1970; Zytowski, 2006) was also developed for research purposes and has seen extensive use in applied settings. In contrast, the Organizational Culture Profile was developed out of the organizational culture tradition and has been used primarily in research on values-based person-organization fit.

One feature common to many work values measures is the use of paired-comparisons, rank-ordering, sorting, or other ipsative response formats. These practices can be highly detrimental to a measure's psychometric properties, including reliability, factor structure, and relations with other constructs and criteria, unless sophisticated IRT-based scoring methods are applied to remove the score ipsativity. Dobson and colleagues (2014) observed that work values measures appear to have suffered from all of these consequences and recommend that future research on work values adopt a traditional, non-ipsative, nomothetic approach to measure development and scoring. As with interest inventories, more research is needed to develop measures of work values that are suitable for personnel selection and other IWO applications.

Minnesota Importance Questionnaire (MIQ)

The MIQ measures 20 work needs. Several large factor analyses of the MIQ facilitated clustering

its 20 Needs scales into six categories that Lofquist and Dawis (1978) labeled Values. The MIQ uses a paired-comparison format that includes 190 pairs from the possible combinations of the 20 items. A ranked form of the MIQ, which takes considerably less time to complete, also is available. The profile reports ipsative scores on the six broad values (Achievement, Altruism, Autonomy, Comfort, Safety, and Status) and the 20 more specific needs organized by value category. The report also provides a comparison of an individual's profile of need and values scores to empirically derived patterns of reinforcers for a variety of occupations. The values measures developed as part of O*NET, the Work Importance Profiler and the Work Importance Locator (McCloy et al., 1999a, 1999b), are heavily influenced by the MIQ and assess similar values dimensions. These instruments also are integrated in the broader O*NET system to facilitate effective consideration of the variety of occupations that exist in the economy.

Super's Work Values Inventory-Revised (SWVI-R)

Super's Work Values Inventory-Revised (Zytowski, 2006) and its shortened version, the Kuder Work Values Assessment (Kuder, 2012), are revisions of the work values measure developed by Super for his Career Pattern Study (Super, 1957). The original version consisted of 15 statements in paired-comparison format, though later versions (Super, 1970) used a 5-point Likert-type response format. The 1970 scales had restricted score ranges and overall high means. In 2006, Zytowski revised the WVI to lengthen the scales and reduce the number of scales from 15 to 12 (Creativity, Intellectual Stimulation, Achievement, Independence, Prestige, Economic Return, Security, Surroundings, Supervisory Relations, Associates, Way of Life, and Variety). Ratings are made independently for each value dimension of the SWVI-R, so individuals can rate all values as important. To facilitate counseling, users are encouraged to rank-order scores to create a values hierarchy for interpretation.

Organizational Culture Profile (OCP)

The OCP is an instrument developed for research purposes to assess fit between individual and organizational values (O'Reilly et al., 1991). The original version of the OCP included 54 items organized into 8 factors (Innovative, Detail-oriented, Aggressive, Outcome-oriented, Supportive, Rewards-focused, Decisive, and Team-oriented). The OCP uses a Q-sort methodology which requires respondents to rank-order the

value items with a forced normal distribution; scores for the OCP values dimensions are thus ipsative. This format has been heavily criticized for its impact on the dimensionality of the measure and its difficulty of use (Sarros, Gray, Densten, & Cooper, 2005). Revised versions of the OCP have been offered that reduce the number of items (Cable & Judge, 1996) or use a more traditional Likert-type response format with non-ipsative scoring (Sarros et al., 2005). The OCP has been used in organizational culture research and has been used less often in other contexts.

Measuring Environments

Research and application of work preferences have focused on the match between individuals' preferences and the features of their environment, whether their vocation, job, organization, or some other context. A perennial issue in research on person-environment fit has been determining how to appropriately conceptualize and measure aspects of the environment.

Most fit researchers have advocated for *commensurate* measurement of individuals and environments wherein both are assessed on parallel constructs. For example, the MIQ is a work values measure that assesses preference for 20 work outcomes, and the Minnesota Job Description Questionnaire (MJDQ; Borgen, Weiss, Tinsley, Dawis, & Lofquist, 1968) assesses the degree to which a job provides those outcomes. Similarly, in Holland's theory, job characteristics are classified using the same six types as individual interests. This approach facilitates easy comparison of person and environment, but also may result in ambiguous environmental descriptions (Ostroff, 2012). An alternative is to examine how preferences interact with environmental features that are not easily mapped into the same structure. For example, Cable and Judge (1994) used a policy capturing approach to examine how values and other personal traits predicted preferences for different pay structures.

In research using commensurate measures, environments typically are assessed in one of three ways. First, environments could be measured as the mean preference level of individuals within them. This approach is straightforward and may be appropriate for some contexts, for example in research on shared work values. However, this method is inappropriate for evaluating many P-E fit questions (e.g., interest fit for predicting performance in entry-level university courses cannot be assessed using mean interest levels of students in each course, as students typically take these

courses because they are required for all majors, rather than out of interest). Second, employees or other raters can evaluate whether the environment actually provides various outcomes or activities. Standardized inventories, such as the MJDQ, the OCP, or the Position Classification Inventory (PCI; Gottfredson & Holland, 1991), have been developed for such evaluations. Finally, characteristics of occupations can be assessed using scores provided by large-scale occupational databases, such as the values and interest relevance ratings in O*NET (Rounds, Smith, Hubert, Lewis, & Rivkin, 1999) or the RIASEC codes presented in the Strong Interest Inventory (Harmon, Hansen, Borgen, & Hammer, 1994) or the Dictionary of Holland Occupational Codes (Gottfredson & Holland, 1996). Choice of method for measuring the environment can have a dramatic impact on relationships observed between congruence and outcomes (Dik, Hu, & Hansen, 2007); empirical research on the relative efficacy of various approaches to environment measurement is lacking.

Measuring Congruence

A variety of methods have been proposed for assessing the match between individual preferences and environmental characteristics. In interest research, person-vocation fit is typically measured using one of several congruence indices. These indices differ in terms of their complexity, in the number of interests dimensions they consider, and the degree to which they incorporate the hexagonal model (see Brown & Gore, 1994; Camp & Chartrand, 1992; Hoeglund & Hansen, 1999; and Young, Tokar, & Subich, 1998 for discussions of various indices). In values research, congruence is typically measured using a similarity index, such as the difference, squared difference, or correlation between levels of individual and environmental values. Congruence and similarity indices have been heavily criticized (Arnold, 2004; Edwards, 1994; Tinsley, 2000a,b). Congruence indices discard information, such as by focusing on only part of an interest profile or by ignoring the direction and magnitude of value incongruence. Difference scores also are notoriously unreliable (Lord, 1963). Most importantly, congruence and similarity indices place constraints on the mathematical forms person-environment interactions can take and ignore the main effects of person and environment (Edwards, 1994). Hexagon-based interest congruence indices also have been criticized because the equilateral hexagon does not accurately reflect interest structure and because interests on opposite sides

of the circumplex are independent, rather than mutually exclusive. As a result, congruence indices incorporating these assumptions are modeling an incorrect theory.

Edwards and colleagues (Edwards & Parry, 1993; Shanock, Baran, Gentry, Pattison, & Heggestad, 2010) have proposed polynomial regression analysis (PRA) and response surface methodology as an alternative to congruence indices. This method has the advantage of relaxing constraints on the form of interaction between person and environment and appropriately models the main effects of each. This method is not a panacea, however. The nonlinear terms in polynomial regression can be as or even more unreliable as difference scores, and very large sample sizes are needed for stable parameter estimates. Additionally, this method may capitalize on chance in the shape of person-environment interactions, and meta-analytic methods for cumulating these results across studies have not been developed. Studies using PRA tend to find small incremental validity of fit over person and environment main effects (Yang, Levine, Smith, Ispas, & Rossi, 2008), but it is difficult to determine whether these small effects result from limitations of the method or from the nature of person-environment interaction.

An alternative to attempting to measure congruence directly is to assess the zero-order predictive validity of interest and values scales in separate samples and then to examine whether validities are moderated by organizational values, job-relevance of interests, or other environmental features. This is the approach used to test situational specificity hypotheses in cognitive ability and personality research (Barrick, Mount, & Judge, 2001; Schmidt & Hunter, 2004). The effects of congruence are measured by the degree to which preference-outcome relationships generalize or are moderated across settings. This approach has the potential for substantially increased statistical power by increasing the sample sizes used to test congruence hypotheses and reducing ambiguity in the methods used to operationalize congruence. This approach also has practical benefits, since applying interest and values scale scores directly is easier than first filtering them through a congruence index.

ORIGINS AND DEVELOPMENT

Heritability and Environmental Influences

Like all human psychological characteristics (Turkheimer, 2000), work preferences are sub-

stantially biologically influenced. Both vocational interests (Betsworth et al., 1994; Lykken, Bouchard, McGue, & Tellegen, 1993; Moloney, Bouchard, & Segal, 1991; Waller, Lykken, & Tellegen, 1995) and work values (Keller, Bouchard, Arvey, Segal, & Dawis, 1992) are highly heritable. Heritability estimates for most interest and work values scales are similar to or larger than those for personality traits ($h^2 = .40-.60$). Prenatal hormone exposure appears to have a strong impact on the development of gender-typical interests. 2D/4D digit ratio, frequently used as a marker for prenatal testosterone exposure, is related to male-typical vocational interests (see Valla & Ceci, 2011 for a review), and women with congenital hormone disorders leading to increased early androgen exposure show much stronger Realistic, Investigative, and Things interests than unaffected women (Beltz, Swanson, & Berenbaum, 2011; Berenbaum & Beltz, 2016). Prenatal androgen exposure is also hypothesized to be an important factor in the development of gender and sexual orientation differences in vocational interests and other personality traits (Lippa, 2005).

Environmental influences, obviously, also play a prominent role in the development of work preferences. Interests which are heavily dependent on environmental exposure, such as agricultural interests, are less heritable in the general population than other interests. Interest in agriculture and skilled trade occupations is limited when individuals have no exposure to these occupations to facilitate accurate evaluations of their characteristics (Cappelli, 1992; Crowley, 1981; Shanahan, Mortimer, & Krüger, 2002). Additionally, family values and demands play a strong role in the development of individual work values and the impact values and interests have on career decisions (Schulenberg, Vondracek, & Crouter, 1984).

Stability and Change

Vocational preferences are highly stable over time. Rank-order stability of vocational interest scale scores in longitudinal studies is on average $\rho = .51$, controlling for the time interval between measurement occasions, when interests are assessed in early adolescence (Low, Yoon, Roberts, & Rounds, 2005). This value increases dramatically during the college years before stabilizing at an average of $\rho = .72$ in the early 20s, where it remains into at least middle adulthood. Vocational interests thus appear to stabilize earlier than do personality traits (Roberts & DelVecchio, 2000). Interest profiles (the relative ordering of interest scales within persons) are even more stable.

Gender, cohort, interest factor, and scale specificity (RIASEC, basic interests, or occupational interests) do not affect stability estimates. Despite rank-order stability of interests, the period between early adolescence and middle adulthood is associated with typical mean level changes in interest levels, with Artistic, Investigative, Social, and Enterprising interests increasing over this period (mean cumulative d s range from .20 to .60; Low, 2009). Realistic and Conventional interests tend to increase for women, but decrease for men over this period. Longitudinal research on stability and change in interests through adulthood, particularly in response to experiences in different occupations and work roles, is lacking (cf. Roberts, Caspi, & Moffitt, 2003; Wille & De Fruyt, 2014).

Work values are similarly stable across time on average (longitudinal meta-analytic $\rho = .62$), but show a different trajectory of stabilization (Jin & Rounds, 2012). Whereas vocational interests become more stable during the college years, work values are the least stable in this period ($\rho = .57$). Work values stabilize once individuals actually enter the adult workforce ($\rho = .66$). Unlike interests, work values were more stable for some cohorts than others (Baby Boomers $\rho = .69$; Generation X $\rho = .48$). Work values also show mean level change across the life course. Intrinsic work values are most important during the college years, but decrease in importance once individuals enter the workforce. Extrinsic, social, and status work values all increase steadily in importance from adolescence through middle adulthood (cf. cross-sectional meta-analytic results by Kooij, De Lange, Jansen, Kanfer, & Dikkers, 2011).

Development of Interests

A variety of theories have been proposed for how individuals develop vocational interests. Many researchers have considered interests to represent merely the interaction of more ‘basic’ personality traits and environments (e.g., Social interests are merely the expression of individuals’ Extraversion and Agreeableness at work; Holland, 1997; McCrae & Costa, 1990). Hogan and Blake (1999) similarly conceived of interests and personality as representing the same traits, but reflecting self-perceptions versus other-perceptions, respectively.

Rounds and colleagues (Low et al., 2005; Rounds & Su, 2014) disagree with this characterization. They regard interests as describing the fundamental ways individuals relate to their environments and refer to their modest relationship and the earlier stabilization of interests compared

to personality traits as evidence of the status of interests as fundamental traits. They argue that while they are related, interests and personality represent distinct individual characteristics. Broad interest domain constructs (RIASEC, Data, Ideas, People, Things, etc.), especially, reflect the fundamental ways individuals approach situations and the kinds of psychological experiences they want from their environments. Kandler and colleagues used behavioral genetics analyses showing substantial genetic variance in interests separate from personality to make a similar argument (Kandler, Bleidorn, Riemann, Angleitner, & Spinath, 2011).

A promising emerging approach hypothesizes that interests do not reflect single personality traits, but rather constellations or configurations of traits within an individual’s profile (Dilchert, 2007; Wiernik, 2016a, Wiernik, Dilchert, & Ones, 2016). Interests develop based on individuals’ examinations of the most prominent features of their personality and ability profiles, regardless of the absolute levels of those traits (i.e., their cardinal traits; Allport, 1961). For example, rather than merely reflecting Extraversion at work, Enterprising interests may emerge when Extraversion is an individual’s personal strength (i.e., the most prominent feature of her profile). Based on their results, Wiernik et al. (2016) argued that broad interest domain constructs could be conceptualized as preferences for work strategies that take advantage of one’s personal ability/personality strengths and minimize one’s weaknesses. For a more detailed discussion of intraindividual trait constellations, see the sections below on interstability and interest–personality relations.

Interventions and Training to Increase Interests

One goal of vocational counseling is to help individuals identify occupations where they will be satisfied and successful and for which there is substantial labor demand. Frequently, individuals express low interest in areas that would otherwise provide good P-E fit due to a variety of factors, including misperceptions about the world of work, stereotypes, and sociocultural pressures (Gadassi & Gati, 2009). Interventions have been designed for these situations to increase individuals’ interests in areas they haven’t previously considered (Brown & McPartland, 2013). Based on the substantial stability of vocational interests across the life course and the influence of biological factors on interests, some researchers have concluded that such interventions are futile

(Schmidt, 2011, 2014). However, interest stability is not so large as to preclude individual change (cf. Roberts et al., 2003; Valian, 2014). Indeed, some interventions to increase women's interest in STEM careers and other traditionally male-dominated occupations and some interventions designed to increase self-efficacy for specific academic domains have been shown to have small effects for increasing participants' measured interests in these areas (Betz & Schifano, 2000; Fouad, 1995; Lapan, Shaughnessy, & Boggs, 1996; Luzzo, Hasper, Albert, Bibby, & Martinelli, 1999; Turner & Lapan, 2005). Thus, while interests are stable, they can be malleable if appropriate situational factors are present.

MEASUREMENT EQUIVALENCE AND GROUP DIFFERENCES

Equivalence across Time Periods

The academic literature and popular press are filled with claims about the changing nature of work and the unique interests, values, and desires of different generations of employees (Deal, Altman, & Rogelberg, 2010; Bradt, 2014). These claims are based on theories that suggest vocational interests and values are heavily influenced by sociocultural factors and on observations of tensions between different-age employees in the workplace (PricewaterhouseCoopers, 2011). If such claims are true, these changes have important implications for the power of interest and values inventories to predict work outcomes. Several studies have examined the degree to which distributions of interests and values within occupations and in the population at large have changed over generations and shifts in societal cultural milieu.

The longevity of the Strong Interest Inventory and infrequent revisions of many of its scales afford the opportunity to look at the extent to which interests of people in an occupation remain stable over time. Prior to the more recent (i.e., 2004) SII revisions, scales assessing RIASEC interests and 18 basic interests were constructed using the same items that were answered by participants in 30 occupational scale construction projects conducted in the 1930s, 1960s, and 1980s. Analyses of these data, which span 50 years, show remarkable stability of interests for women and men in general, as well as for women and men in a wide range of occupations (Hansen, 1988). As illustrated in Figure 14.2, even when mean levels of particular interests within an occupation changed

to a small extent over time, the relative importance of various interest dimensions in defining an occupational interest profile stayed the same over a 50-year period (Hansen, 1988). Changes in generation and society's cultural milieu appear to have had a minimal effect on the characteristic interest patterns of occupations.

More recent work has attempted to separate the impact of age, birth cohort, and temporal period on vocational interests and values. When differences in interests and values are observed between age groups, these differences may be due to generational differences, but also may stem from maturational processes that lead to changing career goals as individuals age (Jin & Rounds, 2012). Empirically separating these influences requires examining samples composed of individuals from a variety of age groups and from different cohorts. Several studies have met this requirement using many years of archival data (Hansen & Leuty, 2012; Leuty & Hansen, 2014) or time-lagged multi-wave designs (Twenge, Campbell, Hoffman, & Lance, 2010). Contrary to hypotheses of generational change in interests, Leuty and Hansen (2014) observed no effect of age or generation on interests (e.g., birth year and age together accounted for less than .01% of variance in all interests), with the exception of Realistic interests, which were negatively related with both birth year and age. Generational differences in work values appear to be somewhat larger, though still small (e.g., mean $d = .14$, controlling for age, Hansen & Leuty, 2012; mean $d = .28$, Twenge et al., 2010). The largest differences appear to be that younger generations value a challenging and engaging work environment somewhat more than did earlier generations and place somewhat more value on work-life balance and compensation. Generation, in general, appears to have more influence on values than does age.

The combined small changes in work values and interests associated with age, generation, and temporal period is surprising given the plethora of popular press articles reporting massive differences in workers from different generations. Lester, Standifer, Schultz, and Windsor (2012) examined this disparity between perception of large differences between generations, as reported in the media, and actual assessment of the differences for the same workers. Their results suggest that the disparity results from too much attention being given to a small number of relatively unimportant variables where actual differences exist (e.g., e-mail communication, social media, fun at work, continuous learning, and professionalism). An alternative approach to that of focusing on the differences in work preferences among the

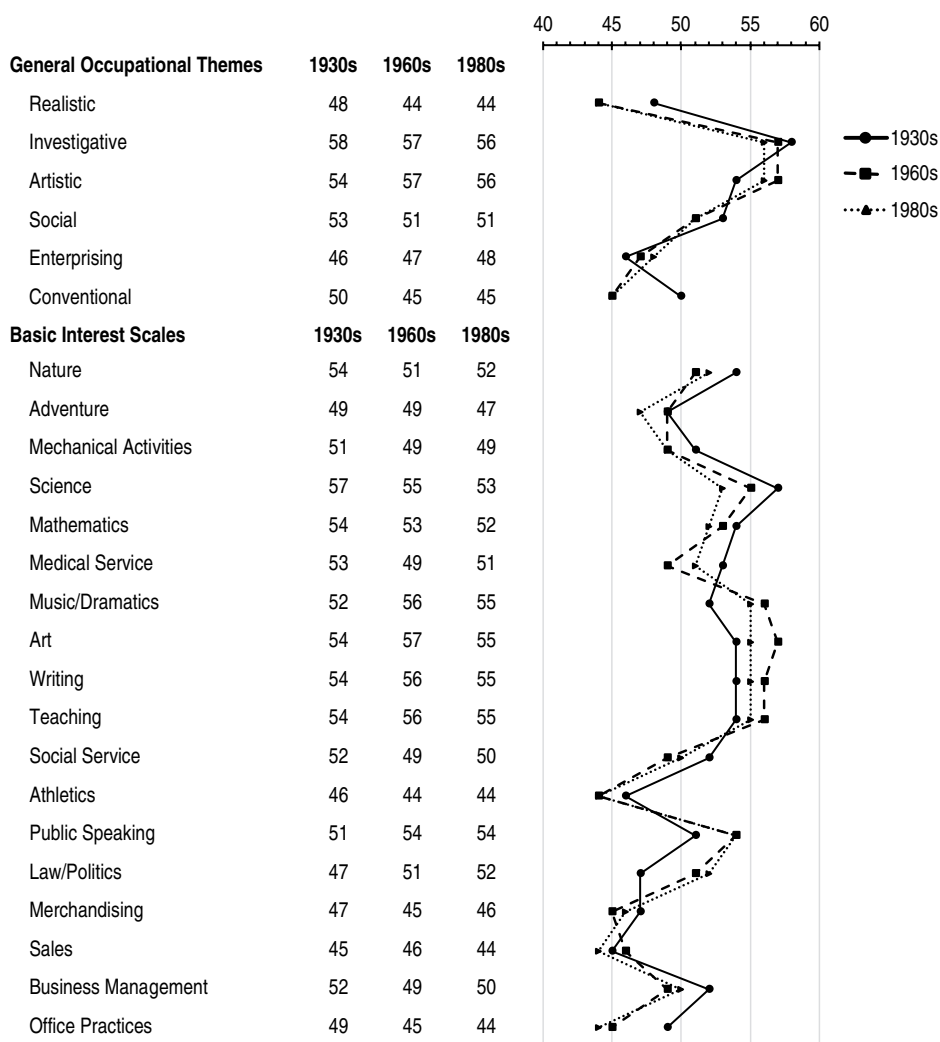


Figure 14.2 Mean interest scores on the Strong Interest Inventory General Occupational Themes and Basic Interest Scales for female psychologists in the 1930s, 1960s, and 1980s

Source: Adapted from Hansen (1988)

generations might be to use commonly shared values to help generations connect.

Cross-Cultural, Ethnic Group and Racial Group Equivalence

The factors of vocational interests appear to be relatively consistent cross-nationally, though the magnitudes of relations among interests and the degree to which the circumplex structure of interests holds do differ across contexts (Rounds & Tracey, 1996). The vast majority of cross-cultural

research on interests has focused on whether Holland's hexagon accurately reflects interest structure cross-culturally. Recently researchers have increased efforts to develop indigenous interest inventories (Einarsdóttir, Eyjólfssdóttir, & Rounds, 2013; Morgan, de Bruin, & de Bruin, 2015) and to examine true measurement equivalence of interest measures across countries in earnest (e.g., Darcy, 2005; Hedrih, 2008; Tracey, Watanabe, & Schneider, 1997; see Hansen, 1987; Tracey & Gupta, 2008, for reviews). The structure of interests tends to be consistent across U.S. racial groups (Day & Rounds, 1998; Ryan, Tracey,

& Rounds, 1996). Similar to broad personality traits, group mean differences on vocational interest scales tend to be negligible or small. Jones (2013) meta-analyzed mean differences in RIASEC interests for Black and White US groups. She found that overall group differences ranged in magnitude from mean $|d| = .06$ to $.23$, with White groups showing somewhat higher levels of Realistic (mean $d = .25$) and Investigative ($d = .23$) interests and Black groups showing slightly higher Social interests ($d = -.13$). Age, education level, and sampling years moderated these relations, with differences generally being smaller in adult and more educated samples in studies conducted in the 1970s and later. Differences between other racial groups tend to be similarly small (Fouad, 2002; Fouad & Byars-Winston, 2005; Fouad & Mohler, 2004). Nonetheless, more studies examining the generalizability of interest relationships across nations, cultures, and ethnic and racial groups are needed.

Studies of the structure of work values have yielded similar results cross-culturally (Elizur, 1984; Elizur et al., 1991; Judge & Cable, 1997; Leuty & Hansen, 2011; Sarros et al., 2005), though the small number of samples and countries limits the generalizability of these findings. The structure of individual differences in personal values also appears to be culturally universal (Gouveia et al., 2014; Schwartz, 1992; Schwartz & Bilsky, 1987). Note, however, that the same values dimensions underlying individual differences *within* cultures does not preclude mean level differences in work and personal values *across* cultures, which do tend to be large (Schwartz, 1999). Research on race and ethnicity and values has generally relied on small samples. The most robust literature has compared values of White and Black US samples. The results from these studies often appear to be a function of social class and family background. When these variables are controlled, Black–White group differences tend to disappear (Rounds & Jin, 2013). Additional research on measurement equivalence and generalizability of work values' construct and criterion relationships across cultures and ethnic and racial groups is needed.

Gender

Gender differences in vocational interests have consistently been observed to be among the largest of all psychological individual differences constructs (Lubinski, 2000; Thorndike, 1911). Energetic debates have ensued regarding whether sex differences represent bias in interest inventories, with some test developers eliminating items that showed

substantial sex differences and others retaining these items, believing they captured true group differences in interests. Su, Rounds, and Armstrong (2009) conducted a large-scale meta-analysis of gender differences in vocational interests and found that women tend to score substantially lower on Realistic interests ($d = -.84$) and higher on Social interests ($d = .68$). Smaller differences also were present for Investigative ($d = -.26$), Artistic ($d = .35$), and Conventional ($d = .33$) interests. Enterprising interests showed negligible differences ($d = -.04$). Tests developed by eliminating items with large group differences showed smaller differences for Realistic and Investigative interests, but not for other dimensions. Substantial variation in gender differences across inventories raises the question of whether Realistic scales showing trivial sex differences are really measuring the Realistic construct. For example, the Realistic scale of the UNIACT-R, which was developed to reduce sex differences, contains more items relating to the outdoors than relating to mechanics, changing the nature of the Realistic construct compared to other inventories. Meta-analyses of basic interest scales showed generally similar patterns of gender differences as RIASEC interests (Schultz & Su, 2016; Su & Rounds, 2015; Su et al., 2009).

While the circumplex structure fits interest data well for both women and men, Realistic interests tend to be less differentiated from Investigative and some Artistic interests in women than in men (Armstrong, Hubert, & Rounds, 2003; Darcy & Tracey, 2007; Hansen, Collins, Swanson, & Fouad, 1993), suggesting that women may not finely distinguish stereotypically masculine activities and occupations.

Gender differences in work values are less pronounced than differences in vocational interests. Konrad, Ritchie, Lieb, and Corrigan (2000) conducted a large-scale meta-analysis of gender differences in work values. Across most dimensions, gender differences were zero or negligible. Similar to vocational interests, the largest differences are women showing more preference for interpersonal work outcomes, such as the opportunity to help others (mean $d = -.35$), make friends ($d = -.22$), and work with people ($d = -.36$). Less pronounced differences are present for extrinsic values, with men assigning more value to earnings ($d = .12$) and leisure ($d = .25$). Additionally, women tend to hold stronger values for intrinsic and self-actualization values, such as task enjoyment ($d = -.16$) and the opportunity to develop ($d = -.18$) or use one's skills or abilities ($d = -.18$). Konrad and colleagues observed that female mean levels of most work values grew higher from the 1970s through the 1990s, indicating higher female aspirations for positive work outcomes as barriers to opportunity declined.

Sexual Orientation and Gender Identity

Although some efforts have been made to develop guidelines for using career assessments with sexual minority clients (Prince, 2013), very few studies have examined the vocational interests and values of gender identity and sexual minority individuals. A preliminary meta-analysis of eight small-sample studies on vocational interests of sexual orientation minorities has found that differences between straight and gay/lesbian individuals mirror male–female differences (Lippa, 2005). Gay men tend to have more feminine vocational interests on average than straight men (mean $d = 1.28$), and lesbian women tend to have more masculine interests than straight women ($d = -1.46$). These differences are similar but slightly smaller than differences between straight men and straight women on the same measure of ‘gender diagnostic occupational interests’ (i.e., essentially a bipolar Things-People scale; $d = 2.65$). Mean levels of interest scores for bisexual individuals are intermediate between straight and gay individuals for each gender ($d_{\text{BisStr}} = 1.01$ for men and $-.52$ for women). Important, for interpreting mean level data is that, in addition to mean differences, lesbian, gay, and bisexual (LGB) individuals are more variable in their levels of gender-typical interests than straight individuals (mean SD ratios [u] = 1.33 for gay men and 1.32 for lesbian women compared to their straight counterpart). Findings from later larger-sample studies have been similar (Lippa, 2008). Results from a single small-sample study suggest a similar pattern for trans individuals (Lippa, 2001). Transgender women (M-to-F transgender individuals) appear to resemble cisgender (non-transgender) women more than they do cisgender men, and transgender men (F-to-M transgender individuals) resemble cisgender men more than they do cisgender women, though more research is warranted before general conclusions can be drawn.

CONSTRUCT VALIDITY

Work and Non-Work Preferences

As would be expected, individuals’ preferences for occupations and workplace activities, environments, and outcomes are related to their preferences in other life domains. Work values, for example, often are assumed to be a subset of the broader personal values construct domain (Elizur et al., 1991). Based on this assumption, some researchers have constructed work values

measures using items drawn from personal values research (Pallini, Bove, & Laghi, 2011). Studies of the relationship between these domains have suggested that individuals view work as a vehicle for fulfilling their personal values (e.g., social and prestige work values are moderately related with self-transcendence and self-enhancement personal values, respectively; Ros et al., 1999). However, correlations among even conceptually similar work and personal values dimensions rarely exceed .30 (Leuty & Hansen, 2013), indicating that desired work outcomes and general life value orientations are relatively distinct domains.

Vocational and leisure interests show much stronger relationships. Conceptually similar work and leisure interests, especially basic activity interests, are typically correlated in the range of $r = .40$ to $.70$ (Hansen & Scullard, 2002; Waller et al., 1995). Additionally, the factor structure of leisure interests is similar to that of vocational interests, with factors of Aritistic/Intellectual, Social/Helping, Competitive, and Outdoor/Adventure interests emerging in most samples (Hansen, Dik, & Zhou, 2008; Hansen & Scullard, 2002; Wilkinson & Hansen, 2006). More so than for work and personal values, vocational and leisure interests appear to capture the same constructs, though the activities that satisfy these interests differ across contexts.

Interests and Career Self-Efficacy

A key historical development in the conceptualization of interests is the incorporation of self-assessments of competence or self-efficacy into interest measurement (Betz & Hackett, 1981). A central proposition of Lent et al.’s (1994) Social Cognitive Career Theory is that vocational interests develop based on individuals’ evaluations of the domains in which they are skilled and likely to achieve desirable outcomes. Measures of vocational self-efficacy show isomorphic factor structures and highly similar nomological networks with vocational interests (Tracey & Sodano, 2013). In the past two decades, many studies have been conducted assessing the relationship between interest and perceived skill in work domains (see Rottinghaus, Larson, & Borgen, 2003; Sheu, Lent, Brown, Miller, Hennessy, & Duffy, 2010 for meta-analyses). In the most comprehensive meta-analysis of interest/self-efficacy relationships, Rottinghaus et al. (2003), reported uncorrected correlations ranging from .50 (Enterprising) to .68 (Investigative), with stronger relationships shown for non-interpersonal versus interpersonal domains. When corrected for unreliability, these correlations range from .54 to .73. Based on this and similar analyses, a consensus has

emerged that vocational interests and self-efficacy are related, but distinct, constructs which reciprocally influence each other during development (Nauta, Kahn, Angell, & Cantarelli, 2002). However, this conclusion fails to consider the hierarchical nature of these traits (Armstrong & Vogel, 2009) and the influence of other constructs, such as general self-efficacy and actual ability and skill (Lubinski, 2010). A more parsimonious approach may be to consider measures of interest and self-efficacy to both be measures of general motivational orientation toward activity domains, with self-efficacy representing a compound of interest, general self-efficacy, and ability. When self-efficacy incrementally predicts outcomes over interests (Lent, Sheu, & Brown, 2010), this is likely due to broader construct coverage of the underlying interest domain and incidental tapping of ability and general efficacy variance.

Preferences and Personality

Research on the relationship between interests and broad personality traits is one of the oldest and longest-lasting lines of inquiry in applied psychology (cf. May et al., 1927). Meta-analyses of bivariate relationships between the Big Five personality traits and RIASEC interests show moderate to strong relationships between Openness and Investigative ($p = .25$) and Artistic ($p = .41$) interests and between Extraversion and Social ($p = .29$) and Enterprising ($p = .40$) interests, as well as weaker relationships between Agreeableness and Social interests ($p = .17$) and Conscientiousness and Conventional interests ($p = .19$; Mount et al., 2005). Openness appears to be related to Realistic interests for women ($p = .17$), but not for men ($p = -.01$; Larson, Rottinghaus, & Borgen, 2002).

Several researchers have suggested that more meaningful relationships might be observed by examining correlations between interests and personality facets (Armstrong & Anthoney, 2009; Armstrong, Day, McVay, & Rounds, 2008; De Fruyt & Mervielde, 1997; Sullivan & Hansen, 2004). For example, the Openness correlation is driven by the Intellect aspect (see Connelly, Ones, and Hülshager, 2018, in *Personnel Psychology and Employee Performance* volume, Ones et al., 2018, Chapter 12) for Investigative interests, but the Experiencing aspect for Artistic interests (Sullivan & Hansen, 2004). Staggs, Larson, and Borgen (2007) made similar arguments with regard to basic interests (e.g., Religious interests are related more strongly to Traditionalism than to other traits measured by the Multidimensional Personality Questionnaire [Tellegen, 1990]).

The links between interests and personality traits also may be best conceptualized using multivariate,

rather than bivariate relationships. Interests may reflect constellations or configurations of personality traits within an individual. For example, Dilchert (2007) found that interests in leadership, influence, and management are strongest in individuals whose most prominent personality traits are high Extraversion and low Agreeableness. Similarly, Wiernik (2016a) showed that Technical (Producing Realistic) interests are strongest in individuals with profiles marked by high Openness to Intellect and low Extraversion.

Relationships between work values and personality traits tend to be modest, in the range of $r = .20-.30$ (Berings & Adriaenssens, 2012; Berings et al., 2004; Furnham, Petrides, Tsaousis, Pappas, & Garrod, 2005; Leuty & Hansen, 2013). Extraversion tends to be moderately related to status, work environment, and relationships values. Openness tends to be related to achievement and autonomy values. Agreeableness tends to be related to relationships and (low) status values. Relationships with Emotional Stability and Conscientiousness have been weaker and more variable across studies. As a set, the Big Five traits tend to account for about 20% of the variance in a particular work value (Berings & Adriaenssens, 2012; Leuty & Hansen, 2013).

Interests and Cognitive Abilities

Compared to personality traits, fewer studies have examined the relationship between vocational interests and objectively measured cognitive abilities. Pässler, Beinicke, and Hell (2015) presented a preliminary meta-analysis of 29 samples reporting relations between RIASEC interests and objective ability measures. They found that correlations between interests and abilities tended to be modest, with overall mean ρ s ranging $-.11$ to $.22$.¹ General cognitive ability is moderately positively correlated with Investigative interests (mean $\rho = .22$) and weakly positively related to Realistic interests ($\rho = .14$). Social interests are weakly *negatively* related to general cognitive ability ($\rho = -.11$).

Interests are more strongly and widely related to specific cognitive abilities. Spatial ability is strongly positively related to Realistic and Investigative interests and weakly to moderately negatively related to Social and Enterprising interests. Verbal ability is moderately positively related to Artistic and Investigative interests. Quantitative ability is moderately positively related to Investigative and Realistic interests and moderately negatively related to Artistic and Social interests. Pässler et al. (2015) found that Conventional interests did not show substantial mean relations to any ability domain. Interest–ability relations tend

to be stronger among adults than adolescents or children, and Realistic interests are more strongly related to general and quantitative ability among women than men.

Much of the literature on interest–ability relations has focused on the role of interest in the acquisition of domain-specific knowledge. Ackerman and colleagues' PPIK theory (Ackerman, Kanfer, & Goff, 1995; Ackerman, 1996, 2000) posits that individuals invest fluid intelligence and effort to develop domain-specific knowledge in areas in which they are interested. Individuals are more motivated and learn more easily in areas where they have strong interest. Ackerman and colleagues' studies have found that Realistic interests are associated with physical science knowledge, Investigative interests with physical and biological science knowledge, and Artistic interests with humanities knowledge, with reliability-corrected correlations in the range of $r_c = .25-.30$; Social, Enterprising, and Conventional interests correlate *negatively* with science and humanities knowledge with similar magnitude, but are positively related with acquisition of business and interpersonal knowledge (Ackerman, 2000; Ackerman, Bowen, Beier, & Kanfer, 2001; Lowman & Leeman, 1988).

As with personality traits, emerging research on the relationship between cognitive ability and vocational interests suggests that interests are more strongly related to an individual's profile or configuration of abilities, rather than to their absolute ability levels. For example, occupational field choices, especially entry into physical science and engineering careers, are strongly related to individuals' personal tilt toward verbal, quantitative, or spatial abilities. Individuals who are strongest in verbal ability, rather than quantitative or spatial ability, are less likely to enter STEM fields, even if their absolute levels of quantitative ability are high (Kell, Lubinski, & Benbow, 2013; Kell, Lubinski, Benbow, & Steiger, 2013; Wang, Eccles, & Kenny, 2013). Ackerman and colleagues have similarly suggested that interests, specific abilities, and personality traits form configurations or 'trait complexes' with unique relationships to knowledge acquisition and other outcomes (Ackerman, 1997; Ackerman & Heggestad, 1997).

CRITERION-RELATED VALIDITY

Vocational interests and work values have been examined as predictors of a wide variety of work-related criteria. Both forms of preferences are hypothesized to influence work criteria through choice behaviors. These choices include the

vocation and career path individuals pursue, the organizations they enter and job offers they accept, the work activities in which they engage and strategies they employ once on the job, and whether they continue in a job, organization, or vocation over time. Meta-analytic studies providing work criteria-related validity estimates are summarized for interests in Table 14.3 and for work values in Table 14.4.

Career Choice and Persistence

The role of vocational interests in career choice and persistence has long been established (Betz, 2008; Dawis, 1991). Indeed, many IWO psychologists believe that career choice is the only criterion interests predict. Several longitudinal studies have shown that interests, especially basic and occupational interests, are excellent predictors of the fields individuals choose to enter (De Fruyt & Mervielde, 1999; Hansen & Dik, 2005; Tracey & Hopkins, 2001). Additionally, people are more likely to leave a field when they have incongruent interests with an occupation (Wille, De Fruyt, & Feys, 2010; Wille, Tracey, Feys, & De Fruyt, 2014). When individuals leave an occupation, they tend to select new occupations that are a better match to their vocational interest profiles, rather than occupations that are equally or less congruent (Oleski & Subich, 1996; Wille et al., 2014).

Attraction and Offer Acceptance

Schneider's (1987a, 1987b) Attraction-Selection-Attrition model predicts that preferences play a strong role in the jobs and organizations individuals choose to enter. Studies generally support this hypothesis. In a job-choice policy-capturing study, Judge and Bretz (1992) found that individuals were most likely to choose a job when the organization's values matched their own, even though both individual work values and job and organizational features also showed substantial main effects. Similarly, Judge and Cable (1997) found that values congruence predicted organizational attraction in actual job applicants. Additionally, perceived person-organization fit, which is strongly influenced by actual values congruence (Edwards, Cable, Williamson, Lambert, & Shipp, 2006), is an important predictor of job choice and offer acceptance (Carless, 2005; Chapman, Uggerslev, Carroll, Piasentin, & Jones, 2005).

While interests have been connected to vocational choice, they have not been examined within the context of job offer acceptance. Research examining how interests are related to attraction

Table 14.3 Meta-analyses of criterion-related validity of vocational interests

Criterion	Predictor	<i>k</i>	<i>N</i>	ρ	80% CV
<i>Work attitudes</i>					
Job satisfaction	Single interest scales ^a	18	>20,000 [§]	.31**†	
	Single interest scales ^b	3	519	.31**	.09, .53
	Single interest scales ^c	5	733	.37*	.27, .46
	Single interest scales ^d	25	7,930	.20 [#]	.09, .31
	Interest congruence indices ^d	59	11,741	.08	-.04, .20
	Interest congruence indices ^e	53	6,557	.17 [‡]	.00, .33
	Interest congruence indices ^b	17	8,608	.20**	.03, .37
	Interest congruence indices ^c	53	9,041	.21*	.01, .41
Turnover intentions	Single interest scales ^f	22	3,722	-.19	-.10, -.29
	Composites of interest scales ^f	17	2,150	Observed $R = -.32$ Shrunken $R = -.24$	
	Interest congruence indices ^f	18			
<i>Actual turnover</i>	Single interest scales ^f	30	14,453	-.15	-.07, -.23
	Composites of interest scales ^f	16	8,526	Observed $R = -.33$ Shrunken $R = -.29$	
	Interest congruence indices ^f	4	1,232	-.15	-.11, -.19
	Single interest scales ^a	3	1,434	.29**†	
<i>Performance</i>					
Overall job performance	Single interest scales ^f	80	14,522	.14	-.02, .30
	Composites of interest scales ^f	60	10,669	Observed $R = .37$ Shrunken $R = .18$	
	Interest congruence indices ^f	8	1,239	.15	.15, .15
Training performance	Single interest scales ^a	11	>6,000 [§]	.20**†	
	Single interest scales ^f	17	3,535	.26	.16, .35
	Composites of interest scales ^f	8	891	Observed $R = .36$ Shrunken $R = .17$	
	Single interest scales ^a	8	>8,000 [§]	.17**†	

Note: Unless otherwise noted, all validities corrected for unreliability in the criterion; 80% CV = 80% credibility interval;

^a Barge and Hough (1988); ^b Tranberg, Slane, and Ekeberg (1993); ^c Assouline and Meir (1987); ^d Earl (2014); ^e Tsabari, Tziner, and Meir (2005); ^f Van Iddekinge, Roth, Putka, and Lanivich (2011); [§] total *N* estimated from *k*, study *N* range, and median study *N*; *Not corrected for criterion unreliability; [‡] median *r*, insufficient information reported to compute credibility interval; [‡] Corrected for predictor unreliability; [#] Corrected for predictor indirect range restriction

to features of specific jobs within an occupation is needed, particularly research on how interests can be targeted in recruitment applications.

Work Attitudes

After vocational choice, by far the most frequent dependent variables in interest research are work attitudes, such as job satisfaction and turnover intentions. All theories of vocational interests predict that interest scales will be strong antecedents of work attitudes. Results for this hypothesis have been mixed. Van Iddekinge, Roth et al. (2011)

found that on average, single job-relevant vocational interest scales showed a meta-analytic mean operational validity for turnover intentions of $\rho = -.19$ with a narrow credibility interval (-.10 to -.29). The average validity for regression-based composites of interest scales was $R = -.32$ (shrunken $R = -.24$). These validity estimates are of similar magnitudes to the values for widely accepted personality predictors of intent to quit, such as Emotional Stability, positive affect, and Conscientiousness (Zimmerman, 2008), and for other forms of person-job fit (Kristof-Brown et al., 2005), suggesting that job-relevant vocational interests are effective predictors of turnover intentions.

Table 14.4 Meta-analyses of criterion-related validity of work values

Criterion	Predictor	<i>k</i>	<i>N</i>	<i>p</i>	80% CV
<i>Recruitment</i>					
Organizational attraction	Person-organization fit ^{a+}	11	9,001	.46	.33, .59
Offer acceptance	Person-organization fit ^{a+}	4	1,828	.24	.13, .36
<i>Work attitudes</i>					
Job satisfaction	Person-organization fit: Values congruence ^b	33	11,716	.48	.25, .71
	Person-job fit: Needs fulfillment ^a	32	8,726	.61	.39, .83
	Person-organization fit: Needs fulfillment ^a	30	9,284	.46	.22, .70
	Person-organization fit: Values congruence ^a	45	23,311	.51	.31, .71
	Person-organization fit: Values congruence ^c	10	1,657	.35	.26, .44
Organizational commitment	Person-job fit: Needs fulfillment ^a	9	1,833	.37	.20, .55
	Person-organization fit: Needs fulfillment ^a	22	6,402	.39	.19, .60
	Person-organization fit: Values congruence ^a	28	18,589	.68	.39, .98
	Person-organization fit: Values congruence ^c	8	1,356	.34	.25, .43
Turnover intentions	Person-job fit: Needs fulfillment ^a	8	2,816	-.50	-.66, -.34
	Person-organization fit: Needs fulfillment ^a	23	6,802	-.34	-.50, -.18
	Person-organization fit: Values congruence ^a	32	18,222	-.46	-.62, -.30
	Person-organization fit: Values congruence ^c	9	2,232	-.48	-.56, -.40
<i>Actual turnover</i>					
	Person-organization fit: Values congruence ^b	5	942	-.38	-.62, -.14
	Person-organization fit: Values congruence ^d	7	2,194	-.26	-.46, -.06
<i>Performance</i>					
Overall job performance	Person-job fit: Needs fulfillment ^a	8	1,558	.20	.14, .25
	Person-organization fit: Values congruence ^b	15	2,098	.14	-.04, .32
Task performance	Person-organization fit: Values congruence ^d	25	7,179	.26	.09, .43
Citizenship performance	Person-organization fit: Values congruence ^d	9	1,258	.25	.17, .33

Note: All validities corrected for unreliability in the predictor and criterion; 'needs fulfillment' = degree a job or organization supplies resources to meet an individual's needs/values; 'values congruence' = similarity of an individual's values to those of other employees or the organization as a whole; 80% CV = 80% credibility interval; ^a Kristof-Brown, Zimmerman, and Johnson (2005); ^b Arthur, Bell, Villado, and Doverspike (2006); ^c Verquer, Beehr, and Wagner (2003); ^d Hoffman & Woehr (2006); + Contains primarily studies of values congruence, with some studies of congruence based on a mixture of values and other characteristics (exact composition not reported).

Several meta-analyses have also observed substantial validity of job-relevant vocational interest scales for job/occupation satisfaction (average validities for job-relevant interest scales ranging $\rho = .20-.37$ across meta-analyses; Assouline & Meir, 1987; Barge and Hough, 1988; Earl, 2014; Tranberg, Slane, & Ekeberg, 1993). Thus, meta-analytic findings also support theoretical predictions about the importance of interest fulfillment for driving work satisfaction, with validities on par with other individual differences variables (Judge, Heller, & Mount, 2002) and other forms of person-job fit (Kristof-Brown et al., 2005). Interests are stronger drivers of job satisfaction when individuals are less intrinsically motivated by their jobs and less psychologically invested in their work (Dik & Hansen, 2011).

Despite meta-analytic evidence supporting their validity, interest measures are often believed to be invalid as predictors of job satisfaction

(Tinsley, 2000a,b). This is because most interest-satisfaction research (including influential meta-analyses) has focused not on interest scale scores, but on congruence indices, which show much weaker validity (mean ρ s range .08-.21 across meta-analyses; Assouline & Meir, 1987; Earl, 2014; Tranberg et al., 1993; Tsabari et al., 2005). Thus, the methodological deficiencies of congruence indices (i.e., discarding information on numeric interest levels and multiple RIASEC dimensions) have lead researchers to draw overly pessimistic conclusions about the value of interests for driving satisfaction. Additionally, most studies of congruence-satisfaction relationships have been conducted on multiple-occupation samples. These studies ignore the substantial main effects of different work environments and individual characteristics on satisfaction, minimizing the relationship person-vocation fit can show with satisfaction (Tinsley, 2000a).

Work values have also been connected to job satisfaction, organizational commitment, and turnover intentions through research on person-job and person-organization fit. Needs fulfillment and values congruence are strongly related to job satisfaction, organizational commitment, and turnover intentions, with ρ s in the range of .35–.65 (Kristof-Brown et al., 2005). These large relationships, compared to the smaller relations between interests and satisfaction, may result from several factors. First, values-attitudes studies may suffer fewer methodological flaws compared to interest studies. Most values congruence studies are conducted in single organizations, and while values research, like interest research, typically uses some form of congruence index, difference scores and other indices common in this literature maintain more information on the degree of fit than do interest congruence indices. Second, the large relations may reflect common method bias if the same individual provided concurrent ratings of both their attitudes and values fit (particularly if a direct measure of 'perceived fit' is used, rather than separate ratings of individual values and environmental values/supplies). Third, beyond these methodological considerations, validity differences also may reflect substantive differences in the impact of different kinds of preferences on employees' subjective work experiences. In the professional counseling experience of the first author, most mid-career individuals seeking vocational counseling left their previous employment due to dissatisfaction related to misfit on work values, rather than boredom or disinterest.

Turnover

Holland's (1997) theory of vocational choice, the Theory of Work Adjustment (Dawis & Lofquist, 1984), and the Attraction-Selection-Attrition (ASA) model (Schneider, 1987a) predict that individuals will exit an organization when the environment is incongruent with their preferences. Research on both interests and values support these predictions. Van Iddekinge, Roth et al. (2011) found mean validities of $\rho = -.15$ for single job-relevant interest scales and $R = .33$ (shrunk $R = -.29$) for regression-based interest composites. Person-organization values congruence shows similar validity levels ($\rho = -.26$; Hoffman & Woehr, 2006). Longitudinal studies also have found that individuals whose work values are least congruent with the values of an organization are most likely to leave (De Cooman, Gieter, Pepermans, Hermans, Bois, Caers, & Jegers, 2009). As is the case for turnover intentions, validity of work preferences for actual turnover is

similar in magnitude to validity of other individual differences traits (Zimmerman, 2008).

Performance

Vocational interests are theorized primarily to have an impact on job performance by influencing individuals' motivation for work tasks – the direction, magnitude, and duration of effort they exert. Individuals are more likely to choose to spend effort and persist on work tasks that support their interests than tasks that do not (Van Iddekinge, Putka, & Campbell, 2011). Individuals are also more likely to choose to develop job-relevant knowledge and skill for areas in which they are interested than for areas in which they are not (Ackerman, 1996). Finally, interests are also likely to influence the habits employees display on the job (Ingerick & Rumsey, 2014) and the strategies they choose to accomplish their work goals (Wiernik et al., 2016). Individuals are more likely to make productive choices when their jobs support their interests. These predictions apply both across jobs and across work activities within a single job. For example, the job of human resource manager includes Social tasks (coaching employees), Enterprising tasks (convincing decision makers to adopt a new policy), and Conventional tasks (maintaining personnel files). Employees' interest levels may differ across these tasks, differentially influencing their performance across domains.

Despite theoretical reasons to expect substantial interest-performance correlations, early meta-analytic results estimated interest-performance ratings correlations at only $\rho = .10$ (Hunter & Hunter, 1984; but cf. Barge & Hough's, 1988, contemporaneous meta-analysis showing stronger validity). Hunter and Hunter's low validity estimate was one of the primary reasons for the disappearance of interest inventories from IWO research. However, this value was based on only three studies, all using the Strong Interest Inventory, with a total sample size of $N = 1,789$. In recent more comprehensive meta-analyses, Van Iddekinge, Roth et al. (2011) and Nye et al. (2012, 2017) found substantially larger validity estimates.

Van Iddekinge, Roth et al. (2011) analyzed 74 studies and 141 independent samples. They found average corrected validities for single interest scales of $\rho = .14$ for job performance and $\rho = .26$ for training performance. Job-specific interest scales (e.g., insurance agent interests) showed larger validities ($\rho = .23$ for job performance) than either construct-based (i.e., interest domain) or basic interest scales ($\rho = .10$ and $.11$, respectively). Additionally, the validity of construct-based interest scales was strongly moderated by the job-relevance of the interest domain. While

the mean validities of RIASEC scales across jobs were all near zero, validities for Investigative, Artistic, and Social interests rose substantially ($p = .15, .19, .17$, respectively) for jobs where these interests were strongly supported. Finally, Van Iddekinge et al. found that combining multiple interest scales using regression-based composites showed much stronger evidence of validity than congruence indices for all criteria.

Nye et al. (2012, 2017) conducted a similar meta-analysis concurrent with Van Iddekinge et al. Using a meta-regression-based technique and different inclusion criteria and statistical corrections, these authors came to largely the same conclusions with estimated validities for RIASEC interest scores of $p = .11$ for task performance, $.20$ for citizenship performance, $-.03$ for counterproductive work behaviors, and $.10$ for training performance. The authors also observed that job relevance dramatically increased interest validity. Interestingly, these authors observed much stronger validities for congruence indices than did Van Iddekinge, Roth et al. (2011). This discrepancy could be due to the meta-analyses including somewhat different sets of studies or due to methodological differences. Nye et al. applied corrections for indirect range restriction, whereas Van Iddekinge et al. did not due to questionable accuracy of available range restriction estimates. Additionally, the regression-based methods used by Nye and colleagues pooled estimates from all interest scales, even job-irrelevant ones, whereas Van Iddekinge et al. included only the most relevant scale from each sample. Unfortunately, Nye et al. (2012, 2017) provided relatively little description of their methods and did not provide their full meta-analytic data tables, so the impact of these differences on the results of the two meta-analyses cannot be determined.

Most research on interests' predictive validity for job performance has been conducted using measures developed for use in counseling settings. This may have reduced the correlations between interests and performance criteria observed in these studies. While measures developed for counseling and selection will tap the same underlying interest constructs, a measure with strong evidence of validity for one purpose will not necessarily show similar evidence of validity for the other. Items which distinguish members of different occupations or predict satisfaction (criteria used for counseling measures) do not necessarily predict performance. Additionally, in counseling settings, item transparency is important for facilitating consideration of career alternatives. In selection settings, transparent items, such as occupational titles, could exacerbate impression management and destroy validity. Van Iddekinge, Putka, and Campbell (2011) examined these issues by developing a RIASEC interest inventory

specifically for use in selection of soldiers. They observed substantial operational validity of vocational interests for technical proficiency and effort ($R_c = .31$ and $.32$, respectively), as well as for job-relevant technical knowledge, interpersonal knowledge, and continuance intentions ($R_c = .48, .29, .32$, respectively). The contributions of each interest scale varied in meaningful ways across criteria (e.g., Social interests were related to interpersonal knowledge). Interests also showed substantial incremental validity over cognitive ability and a personality measure.

Of note, Van Iddekinge, Putka, and Campbell (2011) found that Artistic interests, a domain not supported by any soldier work activities, negatively predicted technical proficiency and effort. Van Iddekinge, Roth et al. (2011) also found that meta-analytic validities of interests theoretically most-frustrated by a job tended to be (negatively) as strong as validities of the most-supported interests. These results suggest motivation and performance can be hindered when employees' interests are discouraged by job demands and organizational requirements.

Research on the validity of work values for performance criteria has been rare and almost exclusively examined in the context of person-organization values congruence. Hoffman and Woehr (2006) found moderate correlations between values congruence and both technical performance ($p = .26$) and contextual performance ($p = .25$). Much of these relationships appear to be mediated by positive work attitudes (Arthur, Bell, Villado, & Doverspike, 2006).

This research suggests that work values contribute to performance but leaves substantial ambiguity as to the meaning of the relationship. Studies of values congruence focus on the interaction between individual and organizational characteristics, ignoring the main effects of both. Research from the personality and job design fields show that certain employee characteristics and work environments promote effective performance regardless of other factors (Barrick et al., 2001; Humphrey, Nahrgang, & Morgeson, 2007; Tinsley, 2000a), and polynomial regression studies suggest that the interaction between individual and organizational values contributes relatively little beyond the main effects (Yang et al., 2008). By focusing on congruence, researchers may have missed work values–performance relations that exist across work settings. For example, Suar and Khuntia (2010) found that individuals' work values scores themselves were related more strongly to ethical behavior and job performance than was values congruence. Chou, Wang, Wang, Huang, and Cheng (2008) also found that both individual values and group values congruence independently contributed to team performance. More studies directly examining the

evidence of validity of work values measures for performance criteria are needed.

Extrinsic Career Success

An emerging area of research is examining the role of vocational interests in extrinsic career success outcomes. Using the Project TALENT longitudinal study, Su (2012) found that interests measured in high school strongly predicted income and occupational prestige measured 11 years later. Interests incrementally predicted occupational prestige beyond ability and personality traits and were the most influential predictors of income among the three sets of predictors. Most of the effects were driven by Social and Realistic interests being associated with lower income and prestige and Investigative interests being associated with higher prestige. However, even within occupational groups, interests were substantially related to income. Using job-level analyses of O*NET data, Huang and Pearce (2013) also found that the interest characteristics of occupations were strongly related to occupations' median salary. Occupations with strong Realistic characteristics paid substantially less and occupations with strong Investigative and Enterprising interests paid much more than other occupations. These studies offer preliminary evidence of the substantial impact interests can have on individuals' career development and financial success. More studies are needed to explore how vocational interests and work values affect other extrinsic career success outcomes, such as income, advancement, and eminence.

POTENTIAL APPLICATIONS AND FUTURE RESEARCH DIRECTIONS

The construct and criterion-related validity evidence we have reviewed show great promise for increased application of vocational interests and work values in IWO psychology. In the following section, we highlight several areas where application of preferences is likely to be useful and offer recommendations for further research.

Personnel Selection

The results of the Van Iddekinge, Roth et al. (2011) and Nye et al. (2012, 2017) meta-analyses show that job-relevant interests can have substantial validity for job performance and turnover. More research is needed to understand how best to

develop interest measures for use in selection. Rather than relying on interest measures designed and validated for use in career choice counseling, researchers and practitioners should develop scales designed specifically for use in selection settings. Van Iddekinge, Putka, and Campbell (2011) offer a template for how these validation studies might be conducted. These authors considered which interest factors were relevant to the particular work activities and criteria of value to the organization and developed an inventory to measure these factors. In future validation research, going beyond hypotheses based on occupational Holland codes will be necessary. As an example, Van Iddekinge and colleagues found that Investigative, (low) Artistic, and Social interests were the strongest predictors of dimensions of performance in military jobs, not Realistic interests as might be expected based on Holland occupational codes.

In addition to validation studies, research on other factors in the implementation of interest measures in selection is needed. For example, little is known about the susceptibility of interest measures to social desirability and impression management in high-stakes settings. Research conducted on the SII in the 1950s and 1960s suggests that these effects are negligible (Abrahams, Neumann, & Githens, 1971; see Campbell, 1971, for a review), but additional studies conducted with more instruments and in contemporary settings are needed. Similarly, research on applicant reactions to interest and values measures in selection settings and the impact of self-selection and recruiting on the variability of preferences in applicant pools is needed. Perhaps most importantly, the implications of interest-based selection for adverse impact need to be investigated. While the impact of race-based differences is likely to be negligible, large gender differences on some interest factors suggest that research is needed to establish whether such large differences are necessarily present on selection-focused interest inventories and whether such differences have the potential for undesirable social and legal consequences.

Job Design

More research is needed on how to conceptualize and measure environmental characteristics in preferences research, including features of occupations, organizations, and particular jobs and work activities. A promising starting ground for this research is the literature on job design (Grant & Parker, 2009; Hackman & Oldham, 1976; Humphrey et al., 2007). Despite both addressing the interaction between individuals and work

environments, the literatures on work preferences and job design have had little influence on each other. Future investigations of the interactions between preferences and workplace characteristics will benefit by focusing on the major dimensions upon which jobs and workplaces have been shown to vary, and work preferences have great potential as explanatory mechanisms for job characteristics whose effects on employee outcomes show substantial variability across settings. Dierdorff and Morgeson (2013) offer an example of this form of research. They show that occupation-level work values are related to a variety of task characteristics, psychosocial characteristics, and contextual/ergonomic work design features and suggest that the effects of work design features occur because they support the work values characteristic of employees in these occupations.

Training

Interests play a major role in the motivation and facility individuals have to acquire specific knowledge and skills (Ackerman, 2000; Ackerman et al., 1995). Situational experiences of interest are related to individual learning mode preferences (Coffield, Moseley, Hall, & Ecclestone, 2004) and contribute to student learning outcomes (Renninger & Hidi, 2011; Silvia, 2008). Future research should examine how vocational interests and work values interact with pedagogical techniques and content during workplace training and explore how to adapt training methods to fit both the preferences of individual trainees and preferences typical of individuals in different occupations, organizations, and jobs.

Promotion, Career Development, and Workforce Planning

Work preferences also have implications for individual career development and organizational workforce planning. Interests and values influence not only how individuals react to features of their occupations and organizations, but also to characteristics of their particular jobs. While individuals' preferences may be met in their current position, the same will not always be true if their work roles change; an engineer who performs well and is satisfied in a highly independent design position may become dissatisfied and fail if moved into an interpersonal managerial position. When facilitating individual development and planning for future workforce needs, human resource managers should

be mindful of whether the objectives and outcomes supported by a position meet the values of potential candidates and whether the particular task demands are likely to be motivating to their interest profile.

Whatever the application of work preferences, we recommend that future research focus on actual scale scores of interest and values measures instead of, or in addition to, congruence indices. In other domains, including ability, personality, and attitudinal research, the main effects of individual characteristics are examined first before investigating their interactions with environmental characteristics. We do not believe that work preferences are so different from other psychological characteristics as to demand an entirely different analytic approach.

CONCLUSIONS

For decades, research on vocational interests and work values in IWO psychology has stagnated. This is unfortunate, as these characteristics represent a vital part of individuals' identities and form a cornerstone of the complete personality system. When organizational psychology separated from counseling psychology and set aside interest research, a vital component of individual differences was forgotten. By adding preferences to the toolbox of ability, personality, and situational factors, applied psychologists can bridge the divide between IWO and vocational counseling and have an even greater positive impact on the experience and outcomes of work.

Note

- 1 Pässler et al. (2015) excluded single-gender samples from their overall meta-analyses. The values reported here are from re-analyses of their data including both mixed and single-gender samples.

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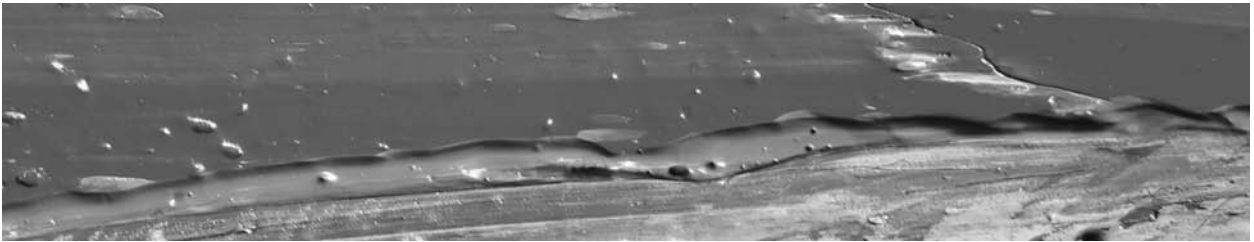
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PART IV

Staffing, Decision Making and Training



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Non-Test Methods and Techniques Used in Employee Selection¹

Chockalingam Viswesvaran and Deniz S. Ones

BACKGROUND

Employee selection is a central function in IWO psychology and constitutes a principal area in the study of work behavior (Farr & Tippins, 2017; Guion, 1998; Viswesvaran & Ones, 2010). The goal is to use evidence-based approaches to identify the individuals who would best make up the workforce in an organization. For effective job performance that contributes to organizational functioning, employees are expected to have the requisite knowledge, skills, and other characteristics. 'People make the place' (Schneider, 1987) and as such, effective personnel selection is critical to the functioning of any organization. Selecting the right people for the right jobs constitutes a source of competitive advantage for organizations. The financial health of an organization is predicated on the optimal selection and placement of employees (Schmidt & Hunter, 1998).

Employee selection starts with the identification of individual characteristics that are likely to be related to job performance. Typically, two sources of information are needed. First, information about 'work' helps one understand what is done in a job (or increasingly, as the traditional concept of jobs disappears, in work roles), under what conditions, and for what purposes (Sanchez & Levine, 2012). This information is obtained through job analysis.

Second, information is needed to identify what is valued to help identify the criteria by which job performance will be judged (e.g., is showing up for work consistently more valued than creating a breakthrough product?). Once the individual characteristics needed for work have been identified and the criteria to be maximized via selection have been enumerated, links between selection assessments to be used and performance criteria need to be established. Content or criterion-related validity can establish these linkages. These lines of evidence establish the relations between standing on the selection assessments and standing on the criterion constructs valued by the hiring organization. Traditionally, this relationship has been indexed by a correlation coefficient referred to as the criterion-related validity. Content-validity approaches establish the same links based on job analytic information. Both can be used to satisfy the job-relatedness of selection systems.

Operationally, employee selection involves the administration of predictor measures to job applicants. Performance on such measures, operationalized as scores, rankings, or preferences, are then used to choose individuals who will contribute the most to organizational objectives. Note that the selection decision is based on an economic composite criterion (Schmidt & Kaplan, 1971) which is also reflected in the construct of general

(overall) job performance (Viswesvaran, Schmidt, & Ones, 2005). Prediction is focused on individuals: those who will perform better than those not selected for the job.

Objectives

Predictor measures are a combination of a construct and a method used in the assessment of job applicants (Arthur & Villado, 2008). For example, general mental ability (GMA) is a construct that can be measured by different methods: a test, an interview, a work simulation, or even certain biodata items. Similarly, we can consider personality traits (the Big Five, compound traits like integrity, etc.) as constructs that can be measured by any of the different methods noted above. In this *Handbook*, we have chapters devoted to different predictor constructs. Dilchert (Chapter 9) discusses the issues in the measurement of cognitive ability whereas Connelly et al. (Chapter 12) address the issues involved in the measurement of personality traits. In Chapter 14, Hansen and Wiernik summarize the research on interests, values, and person–environment fit. In this chapter, our goal is to provide an overview of non-test methods and techniques used in employee selection. Specifically, we focus on background information typically obtained from application blanks, résumé parsing, or inquiries into applicant backgrounds (e.g., reference or credit checks). We also give attention to applicant performance in interviews and simulations (both lower and higher fidelity). We note the emerging research on the use of virtual reality as an additional mode of simulation. We conclude with a discussion of our recommendations for how the field should move forward in terms of which and how selection techniques are used.

Meaningfulness of Research on Methods and Techniques Used in Employee Selection

The techniques reviewed in this chapter can be used to assess many different psychological constructs, combinations of constructs, or no construct at all (e.g., items on a biodata form). But an important question is whether it is meaningful to examine nomological nets of these techniques. To the extent that scores from such assessments are used in operational decision making for employee selection, the response must be yes. For much of the scientific history of employee selection, understanding has followed at the heels of prediction. Nevertheless,

understanding *why* techniques predict performance is critical, both for IWO psychology to function as a science, rather than merely as a technology, and to permit developing innovative techniques and adapting existing techniques to meet changing circumstances. In this chapter, we aim to identify the constructs typically assessed by selection methods and techniques whenever possible to advance understanding and explanation.

ASSESSMENTS OF APPLICANTS' BACKGROUNDS

Job applicant backgrounds are of interest to employers for a variety of reasons. Traditionally, they have been used as signals about applicants' job-related experiences and education. Other applicant background information can be used to infer personal characteristics and job/organizational suitability.

Traditional approaches taken to assess backgrounds of job applicants encompass application blanks, reference checks and letters, biographical data forms (biodata), and approaches developed to assess education, training, and experiences (e.g., behavioral consistency method). Background investigations and credit checks are also used. In all these methods, the focus is on obtaining historical information on the applicants to inform assessments and decisions.

Information culled from résumés and application blanks primarily focus on educational credentials and past experiences. We consider each in turn.

Education

Educational level

Educational level can be considered a proxy for cognitive ability, as well as an indirect indicator of job knowledge acquired in one's chosen field. However, an early meta-analysis established that educational level is a poor predictor of overall job performance (operational validity $r^2 = .10$, Hunter & Hunter, 1984). Subsequent meta-analyses conducted by Ng and Feldman (2009) confirm this conclusion. Educational level's validity for core task performance appears to be modest and variable depending on the source of performance criterion information, though credibility intervals overlapped. Operational validities were $r = .09$ for supervisor-rated task performance and $r = .24$ for objective measures. In the

general population, educational level and cognitive ability correlate about $r = .55$ (Schmidt, Oh, & Shaffer, 2016; Strenze, 2007). However, relations between cognitive ability and educational level can be expected to be much lower in job applicant samples, due to educational requirements (e.g., college degree, JD, MD) for occupational entry. For example, lawyers need law degrees; medical doctors need medical degrees; accountants need accounting degrees for entry into their occupations, and so forth. Although such educational requirements can be expected to have a homogenizing influence on the variation in the 'educational level' predictor, their influence on homogenizing cognitive ability among applicants is minimal. Cognitive ability variability in applicant pools tends to mimic variability in the general population (Sackett & Ostgaard, 1994). The degree of reduced cognitive ability variability among applicant pools, where it exists, tends to be small, typically less than 10–20% lower than the general population (Ones & Viswesvaran, 2003). Educational attainment is thus a poor proxy for cognitive ability (Berry, Gruys, & Sackett, 2006). We suspect that educational level correlates in the .15–.20 range with cognitive ability among medium-complexity job applicants, as such a correlation would wholly explain the large criterion-related validity for cognitive ability as well as the modest (.10) validity for educational level with job performance. Intriguingly, there is strong evidence that educational level correlates with creativity (operational validity $r = .25$; Ng & Feldman, 2009). However, we note that we would expect some of this relationship to arise from cognitive ability, as well as the intellect aspect of the Big Five personality factor openness (Dilchert, 2008). Furthermore, educational level is also unrelated to counterproductive behaviors (Dilchert, Ones, Davis, & Rostow, 2007). The meta-analytic estimate of the relation between educational level and workplace counterproductivity is $r = -.04$ (Ng & Feldman, 2009; for externally measured counterproductivity).

Recent meta-analytic results, however, indicate that educational level appears to be modestly but positively correlated with organizational citizenship behaviors directed at the organization (operational validities in the .11–.13 range, Ng & Feldman, 2009). These findings suggest that more educated employees contribute more to the non-core activities in organizations (Pennings, Lee, & van Witteloostuijn, 1998). More educated individuals also appear to have somewhat fewer sickness-related absences (operational validity $r = -.16$ for objective measures of sickness absences, Ng & Feldman, 2009), a finding in line with general health being associated with higher cognitive ability. Finally, we note that relations between educational level and work performance tend to be higher for higher-complexity jobs (Ng & Feldman, 2009).

Educational performance: Grades and GPA

Beyond merely inquiring about graduation and degree attainment, employers may also cull grade point averages from applicant résumé and, for first-time job market entrants, grades may be inquired on application forms. Grades reflect academic performance and as such capture outcomes of learning in academic environments. They also reflect outcomes of successful behaviors in the educational system (e.g., study habits; Credé & Kuncel, 2008).

Determinants of grades include primarily cognitive ability (Kuncel & Hezlett, 2007; Kuncel, Hezlett, & Ones, 2001), but also personality variables, particularly conscientiousness and, to a lesser extent, openness (Connelly & Ones, 2010; McAbee, Oswald, & Connelly, 2014; Poropat, 2009; von Stumm, Hell, & Chamorro-Premuzic, 2011).

Five meta-analyses have assessed the criterion validity of grades. O'Leary (1980, cited by Hunter and Hunter, 1984) found a correlation of $r = .21$ with promotion ($N = 6,014$), $r = .11$ with supervisory ratings ($N = 1,089$), $r = .30$ with training ($N = 837$), and $r = .05$ with tenure ($N = 181$). Reilly and Chao (1982) found an average validity of $r = .14$ for predicting supervisory ratings and $r = .27$ for predicting compensation. Hunter and Hunter (1984) reported that college grade point average (GPA) predicted supervisory ratings ($r = .11$, $N = 1,089$, $k = 10$), promotion ($r = .21$, $N = 6,014$, $k = 17$), and training success ($r = .30$, $N = 837$, $k = 3$), but not tenure ($r = .05$, $N = 81$, $k = 2$). The most comprehensive meta-analyses of grades has been reported by Roth and colleagues. They carried out two meta-analyses focusing on the relationships between grades and job performance and salary (Roth, BeVier, Switzer, & Schippman, 1996; Roth & Clarke, 1998). Roth et al. (1996) found an observed correlation of $r = .16$ ($N = 13,984$) for predicting job performance, and this correlation rose to $r = .32$ when the validity was corrected for criterion unreliability and range restriction. Several variables moderated grades' validity, including years between grades and performance, type of organization, education level, source of publication, and source of performance information. Grades are also related to salary (observed correlation of $r = .18$, corrected for range restriction $r = .25$, $N = 9,759$; Roth & Clarke, 1998).

Although grades are predictive of work performance, there are several features that limit their potential. Differences in harshness and leniency in grading and differences in course difficulty introduce unknown levels of contamination to grades of different job applicants. This challenge is particularly compounded by increasing

levels of grade inflation over time, making it difficult to compare grades for applicants whose educations are separated by several years (Kostal, Kuncel, & Sackett, 2016). Furthermore, non-standardization across schools (i.e., non-standardization in course content and in grade range and meaning) makes grades challenging to interpret and use fairly across applicants from different educational institutions. Grades also show a simplex pattern of validity (Humphreys, 1960, 1968; Lievens, Ones, & Dilchert, 2009), with increasing degradation in validity for work behaviors the further temporally removed criterion measurement is from the graduation date (Roth et al., 1996). Finally, self-reported grades (versus registrar-verified grades) are subject to impression management and self-enhancing memory biases (Kuncel, Credé, & Thomas, 2005), particularly among low-performing individuals, so they should be used cautiously for decision-making.

For both educational level and grades, the above reviewed literature presumes equal or merit-based opportunities for access to education. Departures from equal or merit-based access can be expected to introduce potential biases to the uses of educational level and grades in employee selection. Caution is warranted.

Work Experience

Work experience refers to 'events that are experienced by an individual that relate to the performance of some job' (Quiñones, Ford, & Teachout, 1995, p. 890). Scientific (i.e., data- and evidence-based) consensus acknowledges that work experience is causally related to acquisition of declarative and procedural job knowledge and therefore results in improved overall job performance, particularly in improved task performance (Borman, Hanson, Oppler, Pulakos, & White, 1993; Carretta & Doub, 1998; McCloy, Campbell, & Cudeck, 1994; Schmidt & Hunter, 1992; Schmidt, Hunter, & Outerbridge, 1986). Organizations often inquire after job experience of applicants in a variety of ways: in application blanks, parsed from résumé, or assessed using more systematic approaches that go beyond years of experience. Job experience contributes to important human resource decisions such as hiring, placement, and promotions (Quiñones et al., 1995; Tesluk & Jacobs, 1998).

Years of experience

Years of experience is one way of assessing the amount of experience that an applicant has had in a job, in an industry, or in a work domain. However, qualitative differences may exist between individuals of similar experience levels (Tesluk & Jacobs, 1998).

The degree of engagement with the job, industry, or work domain is deficiently captured by years of experience's focus on duration. To be sure, duration of exposure is correlated with job knowledge acquisition, but less so than when there is evidence of the degree of actual engagement with tasks that results in declarative and procedural knowledge acquisition.

Years of experience (or any time-based) measures of experience can be conceptualized at the task, job, or organizational level. Job experience refers to the length of experience in a given occupation. McDaniel, Schmidt, and Hunter (1988a, b) reported the largest scale meta-analysis of the relation between job experience and supervisor-rated overall performance, using the General Aptitude Test Battery (GATB) database from the US Employment Service. Across 947 samples ($N = 16,048$), the mean operational validity was $r = .32$. However, there was clear evidence of moderation by job complexity and mean level of experience of the sample. Validities tended to be somewhat higher for low-complexity jobs, but diminished with increasing mean experience levels in the samples examined. For samples that had fewer than 3 years of experience, operational validities were $r = .54$ for low-complexity jobs and $r = .42$ for high-complexity jobs. Validities declined to $r = .34$ and $r = .31$, respectively, when the mean level of experience was over 3 years, but lower than 6 years. After 12 years, the operational validities were $r = .12$ for low-complexity jobs and $r = .16$ for high-complexity jobs. Thus, McDaniel et al. (1988a, b) concluded:

experience is a better predictor of job performance for low-complexity jobs than for high-complexity jobs... job experience has its primary causal impact on job performance through its causal impact on job knowledge. We suggest that job experience has a greater impact on job knowledge and job performance for low-complexity jobs than for high-complexity jobs because of the differences in availability of educational preparation for high- versus low-complexity jobs. For high-complexity jobs, one can gain job knowledge through both formal education and job experience. However, for low-complexity jobs there are fewer formal education sources from which one can gain job knowledge. For example, there are substantially more educational programs directed at professional and skilled jobs than there are for semiskilled and unskilled occupations. We suggest that this difference in sources of job knowledge between high- and low-complexity jobs may account for the moderating effect of job complexity on the experience-performance relation. In low-complexity jobs, job experience is often the sole nonability source of job knowledge. Thus, it is reasonable that the correlation with job performance should be higher

relative to high-complexity jobs, in which job knowledge may be gained both through job experience and formal education.

Quiñones, Ford, and Teachout (1995) reported another independent meta-analysis of time-based job experience–job performance relations. They found that time-based measures of experience had an estimated operational validity of $r = .27$, based on data from 35 studies and 24,457 individuals. However, they did not examine job complexity or level of experience as moderators.

Unlike previous meta-analyses, Sturman (2003) examined validities of both job and organizational experience. Operational validities were much smaller. He found that relations were relatively higher for job experience ($r = .13$, $N = 87,189$, $k = 95$) and lower for organizational experience (tenure) ($r = .06$, $N = 59,444$, $k = 87$). In both cases, objective records of productivity were more highly correlated with experience than job performance assessed by supervisory ratings. However, this difference is likely due to the use of internal consistency reliabilities in the corrections of correlations associated with supervisory ratings rather than interrater reliabilities (Viswesvaran, Ones, & Schmidt, 1996; Viswesvaran, Ones, Schmidt, Le, & Oh, 2014). More importantly, job experience–performance relations were stronger for high-complexity jobs (operational validity $r = .20$; $N = 20,340$, $k = 26$). For high-complexity jobs, there was evidence of curvilinearity in experience–performance relations: job experience became more predictive of job performance over time (Sturman, 2003). For low-complexity jobs, job experience and performance also appeared to be curvilinearly related, but the relationship took the familiar inverted-U shape: predictive validity of job experience diminished after a certain peak.

The practical nuanced implications of these findings were further specified by Sturman (2003, p. 626):

job experience can be a useful selection device in low complexity jobs, when considering candidates with low experience levels, and where productivity ratings reflect the importance of individual job performance. In such circumstances (such as when the average experience level of applicants is one year and task complexity = 2.5), job experience can serve as a highly effective selection device ($r = .31$, ...). Using job experience for a high complexity job..., with a sample with a mean of one year of job experience and where performance is evaluated using supervisory ratings, would produce an expected validity of .14. On the other hand, for a highly complex job with a mean experience level of 15 years, and where performance is captured through objective measures, experience is corre-

lated .36 with job performance. For a sample with 15 years of experience, but for a low complexity job where performance is captured through subjective ratings, the correlation between experience and performance would be $-.01$.

Organizational tenure (i.e., seniority) is experience within an organization. This duration-based index of organizational experience likely indicates the acquisition of work-relevant knowledge and effective organizational socialization (Sturman, 2003). As noted above, organizational tenure's validities for job performance are weaker than job experience. Furthermore, meta-analyses for facets of job performance and other work criteria suggest similarly weak and/or variable results for task performance, citizenship behaviors, counterproductive work behaviors, absences, and accidents (Ng & Feldman, 2013). Most of the unreliability-corrected correlations with non-self-report criteria were the $r = -.07$ to $.06$ range. Overall then, using *organizational* tenure in making staffing decisions is not a strategy that can bear fruit for organizations.

Amount of experience

Rather than focusing on the duration/time associated with experience, another way of conceptualizing experience is by focusing on the quantity (counts) of experiences, such as number of jobs held, number of times performing a task or bundles of tasks, or even number of organizations worked. The criterion-related validity of amount of work experience appears to be high, based on a small set of studies summarized in a meta-analysis (operational validity $r = .43$, $k = 5$, $N = 824$; Quiñones et al., 1995). Future meta-analyses will reveal whether this finding is robust or the result of second order sampling error.

Type of experience

Conceptually, type of experience perhaps contains the most variety of potential work-relevant experiences. Type of experiences can be at the task level, referring for example to task complexity and criticality, at the job level, referring to job complexity, and at the organizational level, referring to type of organization and its industry (e.g., accounting firm experience). Quiñones et al. (1995) reported the operational validity for type of experience as $r = .21$, but given that this estimate was based on only 4 studies ($N = 630$), the robustness and accuracy of that estimate is questionable.

Standardized methods for evaluating quality of training and experience

There are evaluations of job experience on quality factors such as those done in formal Training and

Evaluation (T&E) methods (McDaniel et al., 1988b). Such measures have typically been used in public sector hiring. In these approaches, past training and experiences are evaluated and weighted to produce a score. Although there are multiple T&E approaches (Ash & Levine, 1985), it is useful to distinguish credentialistic and achievement-focused approaches. In credentialistic approaches, points are awarded for having some training credential or having engaged in certain experiences. Points allocated for each credential and experience are rationally determined. Meta-analytically obtained operational validities of such approaches are reported in the $r = .11-.20$ range for job performance (McDaniel et al., 1988b). Task-based T&E approaches ask job candidates to self-report tasks they may have previously engaged in or how well they performed on such tasks. A small-scale meta-analysis of task-based evaluations yielded an operational validity of $r = .15$ (McDaniel et al., 1988b). The behavioral consistency method of evaluating past training and experience is an achievement-focused approach. It asks applicants to describe their own major achievements in multiple job-related areas that are known to supervisors to yield large differences between superior and minimally acceptable performers. Applicant achievements are scored using anchored rating scales. McDaniel et al. (1988b) reported the meta-analytically obtained operational validity of the latter method to be $r = .45$. These findings bolster our point above that the qualitative differences in experience are important.

Overall, predictive validities of experience measures are bolstered when the focus is on capturing past achievements and scoring responses in a standardized manner.

Other Background Data

Job applicants' backgrounds, other than education, training, and experience, can also be assessed for employee selection and decision making. Predictors here include biodata scales, application blanks, reference letters, background investigations, and even credit checks.

Biographical data

Patterns of life history can be predictive of workplace behaviors and they have the potential to illuminate the ecology and ontology of human individuality (Stokes, Mumford, & Owens, 1989). According to Stokes and colleagues, a science of individuality based on traits and cross-sectional data is static and fails to capture the dynamic

interplay between the genetic blueprint of the individual and the environmental processes that act on that genetic blueprint. Biodata measures can be construed as a proxy for differences in developmental experiences.

Longitudinal analyses are one approach to capture the dynamic development process of individuals. Individual features of a person's background experiences (e.g., having been involved in volunteer activities, delinquent behavior) can be used to predict job performance dimensions. For example, adolescent life experiences have been found to be predictors of occupational attainment (Snell, Stokes, Sands, & McBride, 1994). Similarly, Stanek, Ones, and McGue (2017) demonstrated that academic/school deviance (counterproductivity) is predictive of later counterproductive work behaviors. Past drug and alcohol use also predict counterproductive work behaviors. Stanek et al.'s research shows that individuals are consistent in their counterproductive behaviors across school, work, and non-work spheres. Other examples of specific past experiences predicting work behaviors abound and are too vast to review in this overview chapter. However, biodata scales that systematically assess such experiences merit some discussion. Standardized biodata inventories assess a person's prior experiences. Industrial, work, and organizational psychology has a vast literature on methods for developing biodata scales and for item- or option-weighting schemes to compute a biodata score predictive of desired behaviors.

Several meta-analyses have examined the criterion-related validity of biodata inventories. A meta-analysis derived from Dunnette's data (1972, cited by Hunter and Hunter, 1984) indicated a mean correlation of $r = .34$ for predicting job performance. Using military data reported in Vineberg and Joyner (1980), Hunter and Hunter (1984) computed an operational validity of $r = .20$ for predicting global performance ratings and $r = .29$ for predicting suitability ratings. Reilly and Chao's (1982) meta-analyses reported a mean validity of $r = .38$. Brown (1981) meta-analyzed data from 12 US life insurance companies and found an operational validity of $r = .26$ for predicting job performance ratings among sales personnel. The Hunter and Hunter (1984) meta-analysis also found that biodata scales predicted supervisor ratings ($r = .37$), promotion ($r = .26$), training success ($r = .30$), and tenure ($r = .26$). Similarly, Schmitt, Gooding, Noe, and Kirsch (1984), using published studies between 1964 and 1982, found that biodata predicted performance ratings (observed $r = .32$), turnover (observed $r = .21$), achievement/grades (observed $r = .23$), productivity (observed $r = .20$), status change

(observed $r = .33$), and wages (observed $r = .53$). Funke, Krauss, Schuler, and Stapf (1987) reported a European meta-analysis of biodata predicting science/technology research achievement. They found an average operational validity of $r = .47$. Gunter, Furnham, and Drakeley (1993) reported a meta-analysis using British military studies which found an average validity of $r = .21$.

Bliesener (1996) conducted a meta-analysis of biodata inventories as indicators of the validities of background experiences. This study only included articles using biodata scales that contained purely biographical items and no other types of predictors (e.g., personality scales or items). Bliesener found an overall observed validity of $r = .30$ ($N = 106,302$, $k = 165$). He also found that several methodological moderators influenced validity. Double cross-validation resulted in a validity of $r = .50$, while external validation or single cross-validation showed validities of $r = .24$ and $r = .28$, respectively. Concurrent designs produced higher validity than predictive validity or predictive with selection designs ($r = .35$, $.29$, and $.21$, respectively). Biodata differentially predicted distinct criteria. For example, biodata showed a validity of $r = .53$ for predicting objective performance, $r = .32$ for predicting performance ratings, and $r = .36$ for predicting training success. Validities also differed across jobs; validities ranged from $r = .23$ for sales personnel to $r = .46$ for clerks.

An important question with biodata is whether the scoring key (empirically derived or rationally based) can generalize across time and samples. Rothstein, Schmidt, Erwin, Owens, and Sparks (1990) carried out a large-sample study using the Supervisory Profile Record (a commercial biodata inventory) and found that validity generalized across organizations, age, gender, education, supervisory experience, and tenure. The validities for job performance and potential ratings were similar ($r = .34$ and $r = .36$).

A similar validity generalization examination was presented by Carlson, Scullen, Schmidt, Rothstein, and Erwin (1999). Carlson et al. administered a background inventory originally developed to assess potential for managerial applicants in an oil company to samples from 24 different organizations. The original empirically developed key was found to have predictive validity for the same managerial job in different organizations.

Cross-cultural transportability of empirical biodata keys has also been examined. After item modifications for different cultures, empirical keys have been found to be cross-culturally transportable (e.g., Dalessio, Crosby, & McManus, 1996; Hinrichs, Haanpera, & Sonkin, 1976). Presumably, rationally developed biodata scales

would have better transportability due to their focus on constructs.

Taken together, the results of these meta-analyses suggest that biodata scales are valid predictors of performance constructs and that they can generalize across organizations, occupations, and samples. However, recalling that biodata scales represent a standardized assessment *method*, rather than a meaningful construct, we note that the meta-analytic validity estimates for biodata represent *typical* prediction to be expected, rather than a causal, substantive statement about determinants of work criteria being predicted.

Whether biodata scales have incremental validity over individual differences predictors has also been examined, though this question is better framed as 'Do biodata scales typically have potential incremental validity over individual differences measures?'. Schmidt (1988) reported that a biodata scale (Managerial Profile Record) correlated .50 with cognitive ability. Based on these meta-analytic data, Schmidt and Hunter (1998) reported biodata measures provided .01 incremental validity points over general mental ability tests. However, there have been many investigations that have documented small correlations with individual differences constructs and/or more substantial incremental validities of biodata scales over cognitive ability measures (e.g., Booth, McNally, & Berry, 1978; Mael & Ashforth, 1995; Mael & Hirsch, 1993; Mount, Witt, & Barrick, 2000; Schmitt & Pulakos, 1998; Schmidt, 1988; Stokes, Toth, Searcy, Stroupe, & Carter, 1999), personality (Gandy, Dye, & MacLane, 1994; McManus & Kelly, 1999; Mount et al., 2000; Pulakos & Schmitt, 1996) and interviews (Dalessio & Silverhart, 1994; Schmitt & Pulakos, 1998). Differences in incremental validity are also expected and found for different criterion constructs.

As illustration of this last point, in a primary data study investigation, Mount et al. (2000) reported that background data provided incremental validity over job experience, general mental ability, and Big Five personality measures for a quality/quantity productivity measure and interpersonal facilitation, but not for problem solving. The proprietary biodata scales used by Mount et al. were each *theoretically matched* to the criterion being predicted (i.e., interpersonal skills biodata predicting interpersonal facilitation), and therefore, these findings reflect the maximal incremental validity that can be expected from professionally created, cross-validated biodata scales.

Future research should explore what psychological constructs are measured by specific life experiences. Relations with all individual differences constructs, not just personality and cognitive ability (e.g., interests) would be valuable.

For example, Shaffer (2000) correlated measures of Big Five with background scales of collegiate and pre-collegiate behavior, and found meaningful relationships – openness correlated with cultural interests and conscientiousness predicted academic performance. More research linking specific background experiences to individual attributes will be helpful. One caveat here is that many background experiences (e.g., membership in cultural societies) may be a function of multiple traits. If specific biodata items are a reflection of multiple traits, unless a job analysis establishes the job-relevance of all the traits involved, a question for employee selection is whether we can use that biodata item for selection (i.e., are we making selection decisions based on job-irrelevant traits?). This question may become more critical if the irrelevant traits influencing that biodata item have the potential to cause adverse impact for protected demographic groups.

Application form information

Information contained on application forms can be used to screen and select job applicants. Although standardized weighted application blanks have a venerable history in this regard (e.g., Kirchner & Dunnette, 1957; Wernimont, 1962), this line of research is primarily conducted as part of the broader biodata literature (see above), as standardized gathering and scoring of information about applicant backgrounds is involved. However, application forms are completed (often online) as applicants apply for all positions. Indeed, all applicant tracking systems involve having the job applicant respond to some questions, in addition to uploading their résumé. It is our experience that such questions are used as basic minimal screens in ensuring that the individual is appropriate for further consideration for the position they applied for. Such information is either reviewed by HR or more typically used by automated systems to screen out unsuitable candidates. The concern for such information has not been on criterion-related validity, but rather ensuring legality and fairness in applicant processing. Barring use in weighted application blanks, individual items from such application forms are inquired after for administrative purposes and as a means to gather some basic data from job applicants (e.g., contact address, phone, email). Other items may be considered as job-related inquiries (e.g., does the applicant have certification to work as an X-ray technician?). However, previous studies have documented large numbers of items (4–9) that are inadvisable due to legal concerns in the United States (e.g., Burrington, 1982; Vodanovich & Lowe, 1992; Wallace & Vodanovich, 2004; Wallace, Page, &

Lippstreu, 2006). Such items involve information that may lead to identification of legally protected groups (e.g., graduation date for age) or items with no job-relevance (e.g., marital status). As basic background information is gathered from applicant blanks and digital records, we urge caution. Items that may have adverse impact on various groups or invade individual privacy should be balanced with their job-relevance and in most cases criterion-related validity for workplace behaviors. We also note that the growth of readily available digital information on any given candidate (e.g., results from search engine queries or social media sites) is resulting in voluminous data; the validity and legality of obtaining and using information from these sources will need more consideration and research.

Credit checks and reports

Financial background information is increasingly considered in employee selection. Several surveys (cf. Aamodt, 2010; Hollinger & Adams, 2012; SHRM, 2012) have documented that many employers report using employment credit checks in personnel selection. Individuals with lower scores are thought to be risky individuals, given their past financial indiscretions (Gallagher, 2006). Relations with conscientiousness have been hypothesized (e.g., Neilsen & Kuhn, 2009) and found (Bernerth, Taylor, Walker, & Whitman, 2012). Research has linked self-reported financial history like late payments to counterproductive work behaviors (Oppler, Lyons, Ricks, & Oppler, 2008). Other research has found that credit scores are predictive of job-relevant criteria like task performance and organizational citizenship behavior (Bernerth et al., 2012), though not to wages (Weaver, 2015). Beyond their previously mentioned association with conscientiousness, high credit scores are also related to low agreeableness (Bernerth et al., 2012). Sizable positive relations with openness are likely due to substantial openness–cognitive ability relations (Stanek, 2014). Using a large national sample, Weaver (2015) reported that credit scores are highly related to cognitive ability. Individual differences in education and cognitive ability predict credit scores (Israel, Caspi, Belsky et al., 2014). However, sizable group differences on credit scores have been reported (Bernerth, 2012) and potential for adverse impact investigated (Volpone, Tonidandel, Avery, & Castel, 2015). These may arise from cognitive ability, education, and socioeconomic difference, as well as inequality in access to formal financial systems. Much additional research is needed on credit checks and reports in employee screening and selection before it can earn a place as a mainstay of valid

and fair selection systems. Examining criterion-related validity, differential validity and prediction, and incremental validity for a variety of workplace behaviors and criteria is a priority. Replication studies will need to establish generalizability of results.

Background investigations

Background investigations are typically used for applicant screening in public sector employment, though use for high stakes private sector positions is also prevalent. Their usefulness in law enforcement settings have been examined (e.g., Sproule & Berkley, 2001). Some authors have enthusiastically proclaimed 'police officer candidate background investigation as law enforcement management's most effective tool for employing the most qualified candidate' (Bradford, 1998).

Validity or job-relatedness of background information to be gathered using a background investigation is typically established using a job analysis. Job demands and requirements are used to guide whether information uncovered during a background investigation is likely to have an impact on work behavior if the candidate were hired. Best practices in this area have been summarized by Spilberg (2013) in the Background Investigation Manual for the California Commission on Peace Officer Standards and Training. Standardizing the areas to be probed during a background investigation and clustering them around job-relevant psychological dimensions can bolster the job-relatedness and fairness of background investigations. Currently, little quantitative data is generated by typical background investigations, rather potential disqualifying information is enumerated. Precisely what is assessed by these background investigations needs to be evaluated. We suspect behavioral indicators of conscientiousness, integrity, and counterproductivity constitute the lion's share of gathered indicators. As such, relations with integrity tests and other self-reported counterproductivity indices would be valuable. However, first standardization and quantitative scoring of background investigations is needed.

Reference checks and letters

Reference checks used in employment settings rely on information gathered from past employers about a job candidate. A counterpart in admissions is reference letters. Worldwide, they remain a common method used in personnel selection, though in the United States the legal climate during the last quarter of the twentieth century caused a decline in their use. Even though over 30 states have enacted laws that limit legal liability from providing bona fide job

references, these legislations have not had a major impact on the willingness of US employers providing anything more than information on the dates of employment and the positions that the former employee held (Schmidt et al., 2016). Employers possess rich and probably highly predictive information about their previous employees (e.g., disciplinary record, productivity), but such information remains inaccessible to subsequent employers at least in the US.

Two meta-analyses have explored the criterion-related validity of reference checks. Reilly and Chao (1982) found a validity of $r = .17$ for predicting supervisory ratings. Hunter and Hunter (1984) found that references predicted supervisory ratings ($r = .26$, $N = 5,389$), promotion ($r = .16$, $N = 415$), training ($r = .23$, $N = 1,553$), and tenure ($r = .27$, $N = 2,018$). However, Schmidt et al. (2016) argued that the validity of reference checks is unlikely to reach similar levels in current organizations, at least in the US. We believe that traditional reference checks are outmoded in this day and age of technology and are being replaced by background checks that involve social and technological media (Roth, Bobko, Van Iddekinge, & Thatcher, 2016). We applaud efforts to extract reliable and valid information from job-related forums (e.g., LinkedIn). References (and related methods, such as peer personality ratings; Connelly & Ones, 2010) may also be valuable for making internal selection and promotion decisions.

In contrast to the situation with reference checks in employment, reference letters are the third most widely used selection tools, following standardized test scores and grades, in educational admissions decisions. A meta-analysis of reference letters reported their validity for several important criteria (Kuncel, Kochevar, & Ones, 2014). No corrections for statistical artifacts such as range restriction or unreliability could be made due to unavailability of relevant pieces of information (e.g., variability in the applicant pool) or scarcity of data (e.g., unreliability in grades and predictor). Results are nonetheless informative. Criterion-related validity for undergraduate college GPA (i.e., academic performance in university) was $r = .28$. Validities for grades in graduate school and medical school were weaker, likely due to variability reduction in grades in graduate school (i.e., grades tend to be a poorer indicator of performance in graduate school than in undergraduate programs; cf. Kuncel & Hezlett, 2007). Meta-analytic validities for grades were in the $r = .11-.15$ range. In contrast, validity for faculty-rated performance was much higher ($r = .25$). For medical students, the mean validity for clinical and internship performance was $r = .12$. Considering that both involve ratings by faculty and supervisors, interrater unreliability

undoubtedly resulted in attenuation of the operational validity associated with reference letters. If the prevailing interrater reliability of overall job performance ratings by supervisors ($r_{xx} = .52$; Viswesvaran, Ones, & Schmidt, 1996) is used to correct these mean observed validities, operational validities are $r = .35$ and $r = .17$, respectively. The mean observed validity for PhD attainment was $r = .19$. This is impressive, especially given that it is a dichotomous outcome criterion. The magnitude of the relationship may be indicative of motivational variables (e.g., personality, interests) captured in letters of recommendation, especially because Kuncel et al. (2014) estimated that relations with ability test scores were in the $r = .08$ –.14 range. Correlations with prior grade point average and particularly personal statements were higher ($r = .26$ and .41, respectively). These results nicely dovetail with sizable validities obtained from observer ratings of personality (Connelly & Ones, 2010).

We highlight that computing a validity coefficient for reference letters requires standardized scoring of letters. Interrater reliability associated with reference letters is approximately .40 (i.e., correlations between letters from different writers; Kuncel et al., 2014). Using a minimum of 7–8 reference letters per applicant is essential to obtain scores that are reliable enough for use in decision making. Furthermore, inter-scorer reliability between letter readers is also likely to be low, in the range of .40–.60. Mechanical scoring and combination of recommendation letter scores is essential for maintaining high reliability and therefore validity. Typical narrative letters, interpreted by admissions committees and combined holistically, are unlikely to have useful predictive power in selection and admissions.

ASSESSMENTS OF APPLICANTS' PERFORMANCE

Hiring organizations also wish to see job applicants 'in action' so that they can better predict their work behaviors once they are hired. Interpersonal performance is observed during job interviews. Task or interpersonal behavior may be observed during simulations, including assessment centers and on the job (i.e., during work sample performance). In this context, observations of behaviors occur over a relatively short duration, applicants are well aware that they are under observation, and they put forth maximal effort to present themselves in the best light possible. As such, performance on these selection methods matches the basic definition of maximal performance (Sackett, Zedeck, & Fogli, 1988). Recalling the distinction between

maximal and typical performance can help better interpret the literatures associated with these methods used in employee selection.

Performance in Interviews

Interviews are a method to gather information about any number of job applicant attributes during an interpersonal encounter. In addition to being a medium of information exchange, regarding them as interpersonal performance during an observed episode or a series of episodes by one or multiple raters (interviewers) can help understand the relatively unanticipated success of this method in the prediction of job performance constructs.

Personnel selection systems invariably include an interview and, as such, interviews are a ubiquitous feature of selection systems (cf. Campion, Palmer & Campion, 1997). The interview is the most-used procedure in personnel selection across all countries. Job applicants expect to be interviewed; managers expect to interview some or all candidates. Unstructured, conventional, one-on-one interviews continue to dominate employee selection in organizations. However, there is increasing use of structured interviews. Panel (group) interviews remain popular in public sector hiring. Technology-mediated interviews have progressed from telephone interviews to video interviews, including asynchronous video interviews wherein applicants record and submit video responses to a standardized set of written questions.

Several meta-analyses assessing the criterion-related validity of interviews have been carried out. Huffcutt, Culbertson, and Weyhrauch (2014) showed that many of these meta-analyses have underestimated validities by failing to appropriately apply indirect range restriction corrections. In these meta-analyses, interviews are usually classified as unstructured versus structured, and criterion-related validities are estimated for each group. Interview structure is defined as 'any enhancement of the interview that is intended to increase psychometric properties by increasing standardization or otherwise assisting the interviewer in determining what questions to ask or how to evaluate responses' (Campion et al., 1997, p. 656). Although over a dozen elements can be structured for interviews, three features appear to be defining: consistency of questions, standardization of evaluation, and job-relatedness and content of questions (e.g., behavioral description or situational questions).

For predicting job performance, Weisner and Cronshaw (1988) found a corrected validity of $r = .31$ for unstructured interviews and $r = .62$ for structured interviews. In one of the most

comprehensive meta-analyses of this domain, McDaniel, Whetzel, Schmidt, and Maurer (1994) classified interviews to three types: situational, job-related, and psychological interviews. They found operational validities of $r = .50$, $r = .39$, and $.29$, respectively (uncorrected $r = .27$, $.21$, and $.15$; structured job-related interviews showed stronger validity, but insufficient data were available to separate interviews by structure for other categories). Huffcutt and Arthur (1994) conducted another relevant meta-analysis in which the interviews were classified into four levels of structure. They found that the corrected validities ranged from $r = .20$ to $.56$, for lowest and highest level of structure, respectively. Based on these studies, Campion et al. (1997) declared that 'in the 80-year history of published research on employment interviewing, ... few conclusions have been more widely supported than the idea that structuring the interview enhances reliability and validity' (p. 655).

Schmidt and Rader (1999) meta-analyzed criterion measures not included in previous meta-analyses. They found that the structured interview they studied correlated with production records ($r = .40$), sales performance ($r = .24$), absenteeism ($r = .19$), and job tenure ($r = .39$). For predicting training performance, the operational validity of unstructured interviews ($r = .36$, $k = 30$, $N = 45,576$) appears to be on par with structured interviews ($r = .34$, $k = 26$, $N = 3,576$; McDaniel et al., 1994). In the past 15 years, several other reviews and meta-analyses have continued to report sizable validity for interviews (e.g., Hell, Trapmann, Weigand, & Schuler, 2007; Oh, Postlethwait, & Schmidt, 2013; Posthuma, Morgeson, & Campion, 2002; Salgado & Moscoso, 2002; Van Iddekinge, Sager, Burnfield, & Heffner, 2006). These studies have led to several refined insights about the validity of interviews.

Focusing on situational and behavior description interviews, Huffcutt, Conway, Roth, and Klehe (2004) meta-analyzed 54 studies and reported that across the 22 studies using behavior description interviews, validities remained constant across job complexity levels. However, across the 32 studies using situational interviews, there was less certainty about the constancy of validity across job complexity levels. Another finding from the Huffcutt et al. (2004) meta-analyses was the finding that concurrent validities in this domain overestimate predictive validity by approximately .10 correlation points.

Perhaps most remarkably, Schmidt and Zimmerman (2004) pooled results across 4 primary datasets to examine whether unstructured interviews could match the validity of structured interviews. They concluded that compositing 3–4 unstructured interviews reached the same predictive validity as a structured interview. This finding

poses a choice for HR professionals. Obtaining worthwhile validity from interviews requires effort and resources either in the form of systems and procedures to standardize and structure the interviews or to devote significant numbers of interviewers for each candidate being evaluated. Compositing multiple unstructured interviewer scores may have benefits over structured interviews for considerations other than validity, such as better applicant reactions. Interviewers, however, vary in the degree of the validity of their ratings (Van Iddekinge et al., 2006), though statistical artifacts, chiefly sampling error, appear to be behind this finding. Nonetheless, the fact that by chance some interviewers may have low, no, or even negative validity speaks to the need to use multiple interviewers' ratings in employment decision making.

The past two decades of research on interviews have also seen an emphasis on what constructs are measured in interviews (e.g., Huffcutt, Conway, Roth, & Stone, 2001). Much attention has gone to examining interview–cognitive ability relations. For example, Huffcutt, Roth, and McDaniel (1996) found a corrected average correlation of $r = .40$ between interviews and GMA, but this value was moderated by degree of structure within the interview, with the correlation decreasing as the degree of structure increased. The results showed a corrected average correlation of $r = .50$ for a low degree of structure and $r = .35$ for a high degree of structure. Another meta-analysis reported structured conventional and behavioral interviews to be correlated with cognitive ability ($r = .41$ and $.28$, respectively; Salgado & Moscoso, 2002). Pooling previously meta-analyzed studies and adding 15 new studies to the database, Sackett, Lievens, Berry, and Landers (2007) reported a corrected correlation of $r = .24$ between interview scores and cognitive ability. As would be expected, test availability resulted in greater overlap between interview ratings and ability tests (corrected $r = .44$). However, Roth and Huffcutt (2013) questioned Sackett et al.'s (2007) coding judgments and separated educational versus employment interviews; they estimated overall interview ability convergence as $r = .42$ (cf. $r = .24$ for Sackett et al.).

Salgado and Moscoso (2002) carried out a comprehensive meta-analysis on the construct validity of structured interviews reported in the literature. They classified interviews to two types according to their content: conventional interviews and structured behavioral interviews. They found sizable relations of conventional interviews with social skills ($r = .46$), emotional stability ($r = .38$), extraversion ($r = .34$), openness ($r = .30$), agreeableness ($r = .26$), and conscientiousness ($r = .28$), but also with experience ($r = .29$). For

structured behavioral interviews, relations were large for job experience ($r = .71$), social skills ($r = .65$), and job knowledge ($r = .53$), but modest for emotional stability ($r = .08$), extraversion ($r = .21$), openness ($r = .09$), agreeableness ($r = .14$), and conscientiousness ($r = .17$). Consistent with these findings, a small meta-analysis suggested that structured interviews have little personality saturation (Roth, Van Iddekinge, Huffcutt, Eidson, & Schmit, 2005).

Research has confirmed the findings from the last century (summarized in Salgado, Viswesvaran, & Ones, 2001) that interviewer and interviewee demographic characteristics have minimal biasing effects (e.g., Sacco, Scheu, Ryan, & Schmitt, 2003). Landy (2008) pointed out that findings of bias from experimental lab studies do not necessarily translate to field settings. Other reviews (Morgeson, Reider, Campion, & Bull, 2008), however, cautioned against dismissing the potential for bias based on group membership. In fact, Morgeson et al. (2008) suggested that older interviewees may be at a disadvantage – a troubling finding given the aging of the workforce in many countries (Ones, 2016).

Impression management in interviews has also been extensively studied (Van Iddekinge, McFarland, & Raymark, 2007). However, in the 2010s, research focus on impression management in interviews shifted by making the important realization that impression management may actually contribute to interview criterion-related validity. In a meta-analysis, Barrick, Shaffer, and DeGrassi (2009) found that impression management tactics and verbal and nonverbal behaviors are predictive of interview ratings, with low structured interviews being more influenced. However, both impression management and verbal/nonverbal behaviors showed some predictive validity for job performance ($r = .15$ and $.23$, respectively). Barrick et al.'s (2009) meta-analysis also confirmed the generality of research linking physical attractiveness to many job outcomes, including interview performance (e.g., Hosoda, Stone-Romero, & Coats, 2003). Barrick et al. found that applicant appearance appears to have a strong correlation with interview ratings for low and medium structured interviews ($r = .88$ and $.52$, respectively), as well as some predictive validity for job performance ($r = .14$).

Although an interview can be designed to assess multiple constructs (Levashina, Hartwell, Morgeson, & Campion, 2014), Darr and Catano (2008) report that assessments in multiple dimensions are affected by a general factor. This parallels the finding in job performance ratings that a general factor dominates ratings on multiple dimensions (cf. Viswesvaran et al., 2005). The presence of the general factor can be lowered by

use of multiple raters – nevertheless a substantial true general factor remains even when different raters are used to assess the different dimensions. The substantive variance of this general factor in interview performance may be especially valuable for predicting the general factor of job performance. The substantive meaning of the interview general factor needs to be investigated.

Little is known about the validity of interviews for criteria other than overall job performance, task performance, and training performance. Given that interpersonal behavior is fundamental to performance during interviews, it would make sense to examine the criterion-related validity of interviews for interpersonal behavioral criteria at work, as well as interpersonal organizational citizenship behaviors (see Allen, Fecteau, & Fecteau, 2004, for an example of structured interviews predicting citizenship behaviors). We expect substantial validities, especially if structured interviews and multiple interviewers are used.

Another obvious analysis that needs to be carried out with existing meta-analytic databases is an examination of whether interviews predict job performance better when interpersonal demands of the jobs are high. The extreme focus in the interview literature on whether interview scores are related to cognitive ability test scores appear to have detracted interview researchers from examining these potentially important questions with high relevance for practical application. Finally, we know very little about differential validity and predictive fairness of interviews. These basic investigations are essential as our field supports the use of structured or multiple-rater unstructured interviews.

Performance in Simulations

The use of simulations in personnel selection has had a long and distinguished history (Wernimont & Campbell, 1968, Asher & Sciarrino, 1974; Whetzel & McDaniel, 2009). Simulations are based on the principle of behavioral consistency between what job applicants are asked to do in predictor assessments and what they will be expected to do on the actual job. Simulations abstract the essential elements from the job/task setting and elicit responses from job applicants that can then be scored for appropriateness in a standardized manner. Simulations can capture the psychological and physical aspects of the work settings and thus vary along a continuum of fidelity.

At the low end of the fidelity continuum are situational judgment tests (SJTs), which have been referred to as low-fidelity simulations because the

situations to be responded to are described in narrative texts (i.e., scenarios), though video-based SJTs also exist. Simulations that use games and virtual reality technology rank higher in terms of fidelity than SJTs. Assessments that actually place applicants into situations that mimic work settings involve specific behavioral exercises, such as in-baskets or role plays. Bundles of such exercises constitute assessment centers. Other high-fidelity simulations include work sample assessments.

In this chapter, we do not consider SJTs because our focus is on non-paper and pencil predictors. However, video-based tests are increasingly used for selecting people, and, in general, the results appear to be supportive of their criterion-related validity. Video-based SJTs have higher ecological validity than paper and pencil SJTs. Hough and Oswald (2000) suggested that their validity is improved as the content in the video format is preserved and irrelevant variance related to reading comprehension is removed. Meta-analytic evidence for this hypothesis was reported by Christian, Edwards, and Bradley (2010). Criterion-related validities for video-based SJTs were substantially higher than paper and pencil SJTs. When the SJT measured interpersonal skills, the respective operational validities were $r = .27$ and $.47$. When the SJTs assessed leadership skills, the operational validities were $r = .27$ and $.33$, respectively. Even when the SJTs assessed unknown heterogeneous constructs, the operational validity difference persisted ($r = .25$ and $.36$, respectively). These findings are suggestive, but nonetheless preliminary, as the number of studies for the video-based SJTs were fewer than six.

Moving along the continuum of fidelity, Virtual Reality Technology (VRT) enhances video-based assessments to have even greater contextualization and ecological validity (Pierce & Aguinis, 1997). VRT is a computer-simulated multisensory environment in which the perceiver feels as if she or he is present in an environment generated by a computer. VRT engages individuals in the simulated environment by requiring navigation, interaction, and immersion (Vince, 1998, 2004). Aguinis, Henle, and Beaty (2001) provided the first extensive discussion of VRT use in employee selection. Their Table 2 provided examples of VRT techniques that could be used to assess job knowledge, skills, abilities (cognitive, psychomotor, physical, and perceptual), as well as conscientiousness and integrity. However, a few small-sample investigations notwithstanding (e.g., Pamos, 1999), studies examining validities associated with these technologies have not been forthcoming from selection contexts, though studies on VRT simulations from medical and military training research support their validity (Colegrove & Bennett, 2006;

Kunkler, 2006; see also discussion by Campbell & Wiernik, 2015).

Games

The past two decades have seen incredible technological advancement in the design of simulations. Although researchers have made the distinction between high- and low-fidelity simulations, the simulations developed and marketed by organizational companies involve multimedia components not usually reflected in the published empirical literature. Fetzter and Tuzinski (2013) summarized how technology has enhanced realism to such an extent that Fetzter coined the term ‘gamification’ to describe such simulations. Gamification captures how modern simulations immerse job applicants in the work context to assess their competencies.

A challenge to the study of such high-fidelity simulations is the high cost of developing them and validating a scoring algorithm. Given that these costs run to millions of dollars, many of these simulations are proprietary, and empirical research on them is found mainly in technical manuals. In addition to costs, the complexity of the technology needed to create 2D and 3D animations, avatars, etc. also makes the construction and testing of these modern simulations a challenge that can be addressed mainly by commercial organizational consulting companies (Hawkes, 2013). Clearly, the technology employed in operational personnel selection simulations has sometimes outstripped the technology used in simulations included in research (Ryan & Tippins, 2009).

Thus, a problem encountered in this area is that most of our empirical research (on validity, faking, comparison of scoring keys, group differences, predictive bias, applicant reactions, etc.) are based on simulations that do not mirror the media-rich simulations sometimes used in the field. The generalizability of our research literature to practice can only be addressed if more of their psychometric details are published in peer-reviewed journals. Unfortunately, our journals rarely publish validation studies (or studies that focus on faking, comparison of scoring keys, group differences, predictive bias, applicant reactions, etc.); published studies are expected to make a “theoretical contribution” to organizational science. Campbell and Wilmot in their chapter on the role of theory (Chapter 1, this *Handbook*) lament the TFTS (‘Theory for Theory Sake’) phenomenon in IWO psychology. We believe the current empirical research base on simulations is one area that has been particularly adversely affected by the TFTS phenomenon. Very few journals, the *International Journal of Selection and Assessment*

notwithstanding, consider the publication of real-world validation studies of unique predictors and those employing unique samples. Consistent with this observation, the only study reporting the validity of interactive multimedia simulation was published recently in the *International Journal of Selection and Assessment* (Fluckinger, Dudley, & Seeds, 2014). Fluckinger et al. summarized how media-rich simulations are distinct from other simulations used in employee selection.

There are reasons to expect differences in the psychometric properties between the media-rich proprietary simulations and their less-costly versions used in the published empirical literature. Test-taker motivation may differ between the simulations; Chan and Schmitt (1997) showed that as the fidelity of the simulations increase, test-taker motivation increases. Face validity perceptions are improved with the use of multimedia approaches (cf. Shotland, Alliger, & Sales, 1998). Such increases in test-taker motivation and face validity are likely to reduce measurement error (Schmidt & Hunter, 1996). Psychometric theory stresses that to obtain valid scores, test-takers should be engaged in the assessments (Osterlind, 2010). Chan and Schmitt (1997) also report that group differences decrease as measurement fidelity increases. Basic research into the psychometric properties of gamified selection techniques is essential. As Ryan and Ployhart (2014) stated:

‘gamification,’ or the use of computer simulation games for business-related purposes (including recruiting and selection), is emerging as a stable industry yet gives little to no attention to the scientific literature on psychometrics or assessment. So although we hear talk about how crowdsourcing and other advances from the use of algorithms in Internet searches and in financial circles will make their way into making predictions about job applicants, we have yet to see published work on their application in this These are the research frontiers at the moment, and they are areas that investigators must examine or else the field runs the risk of being marginalized by gaming and technology-focused developers. (pp. 704–705)

In this vein, we also suggest that one area that must be addressed by rigorous IWO research is whether such technology-mediated high-fidelity simulations offer meaningful advantages over less-expensive traditional simulations.

Traditional simulations

Traditional simulations create actual job and task contexts and immerse candidates in these contexts

to perform tasks under observation. Examples of traditional simulations include in-baskets, role plays, leaderless group discussion, case analysis, oral presentations, customer meetings, and the like. Performance on these and other in-person, live (therefore high-fidelity) simulations calls for maximal performance from job candidates. Most researched simulations have been examined in the context of managerial selection.

A taxonomy of exercise characteristics has been proposed to illuminate features of simulations that may be useful in investigating psychometric properties and for guidance in applications (Hoffman, Kennedy, LoPilato, Monahan, & Lance, 2015). These characteristics are: complexity (degree of information processing required for task completion), interdependence (degree of cooperation required for task completion), structure (degree to which the task is well-defined and unambiguous), interpersonal interaction (degree to which interpersonal interaction is needed), and fidelity (degree to which the simulation reflects the job context). Hoffman et al. (2015) reported a series of meta-analyses examining the criterion-related validities of in-baskets, leaderless group discussions, role-plays, case analyses, and oral presentations for job performance. True score validities were $r = .18, .17, .16$, and $.19$, respectively. Although range restriction, predictor reliability, and criterion reliability were all corrected for, the reliance on internal consistency estimates in corrections for performance measurement error resulted in underestimation of the operational validities of these simulations. Using interrater reliability estimates would have resulted in validities in the $r = .21-.25$ range. Interestingly, higher validities appear to have been reported when simulations were standalone assessments, rather than administered as part of assessment centers. For each simulation, relations with cognitive ability tests and Big Five personality constructs were modest. Relations were weakest for Big Five constructs associated with Factor Alpha (Digman, 1997) – emotional stability, agreeableness, and conscientiousness. Using these simulations as a set yielded useful levels of incremental validity over the individual differences variables.

Assessment centers

Assessment centers bundle various simulations to elicit behavior that can be evaluated, scored, and used in the prediction of work-relevant criteria. Trained assessors independently observe and rate candidate behavior. Assessment centers are high-fidelity assessments – they are highly contextualized. The goal is to have candidates show that they can perform appropriately in realistic simulated

workplace situations. The focus is on evaluation of maximal performance.

Several meta-analyses have reported the validity of overall assessment center ratings. The first two meta-analyses of the criterion-related validity of the assessment center method (AC) were carried out by Schmitt et al. (1984) and Hunter and Hunter (1984). Schmitt et al. found that AC was a good predictor of job performance ratings (observed $r = .43$, $k = 6$, $N = 394$), grades (observed $r = .31$, $k = 3$, $N = 289$), status change (observed $r = .41$, $k = 8$, $N = 14,361$), and wages (observed $r = .21$, $k = 4$, $N = 301$). Hunter and Hunter (1984) reported that AC predicted promotion (median $r = .63$) and performance ($r = .43$, corrected for attenuation). Gaugler, Rosenthal, Thornton, and Bentson (1987) used a larger meta-analytic database. They reported a meta-analytic operational validity of $r = .36$ for overall assessment center ratings predicting job performance (corrected for criterion unreliability and range restriction). A meta-analysis of the literature published since 1987 (Hardison & Sackett, 2004) reported an operational validity estimate of $r = .28$ (corrected for unreliability in the criterion only). These operational validities for *overall* AC ratings are referred to when assessment centers are compared to other predictors (e.g., Schmidt & Hunter, 1998).

Literature in the past decade and half has turned to evaluations of AC validity focused on construct dimensions and exercises. The results for the latter were reviewed above (Hoffmann et al., 2015). Arthur, Day, McNelly, and Edens (2003) conducted a meta-analysis of the primary construct dimensions underlying assessment center ratings. They first established a taxonomy of 7 primary AC dimensions from a list of 168 lower-order constructs typically measured in assessment centers: problem solving, organizing and planning, influencing others, consideration/awareness of others, communication, drive, and tolerance of stress/uncertainty. Operational validities for six of these dimensions could be estimated using meta-analysis. They were $r = .39$, $.37$, $.38$, $.25$, $.33$, and $.31$, respectively (excluding tolerance of stress/uncertainty).

Assessment centers can be designed to assess a variety of individual differences constructs, including cognitive ability. Overall assessment center ratings correlate $r = .43$ with cognitive ability tests (Collins, Schmidt, Sanchez-Ku, Thomas, McDaniel, & Le, 2003). However, this relationship may reflect the holistic data combination methods used in deriving overall assessment center ratings (Dilchert & Ones, 2009). Meriac, Hoffman, Woehr, and Fleisher (2008) and Dilchert and Ones (2009) reported the incremental validity of AC dimensions over cognitive ability and Big Five personality dimensions in the prediction of job performance. Yet, it is worth

noting that mechanical composites of AC dimension scores outperform overall AC ratings that include holistic data combination to predict job performance (criterion-related validities are $r = .44$ and $r = .31$, respectively; see also Kuncel, Klieger, & Ones, 2014, and Kuncel, Klieger, Connelly, & Ones, 2013, for discussions of the two data combination methods in workplace assessments). Mechanically combined AC dimension ratings have sizable criterion-related validity, and they correlate little with cognitive ability tests. As such, they have sizable incremental validity for selection systems aiming to predict overall job performance.

Two recent articles have made the point that aggregating dimension and/or exercise scores affects the proportion and composition of reliable variance in AC scores (Kuncel & Sackett, 2014; Putka & Hoffman, 2013). Kuncel and Sackett's (2014) finding that the largest source of dimension variance in ACs is a general factor parallels findings from interview ratings (see above) as well as job performance ratings. The ubiquity of general factors in these three behavioral performance domains necessitates investigations into their etiologies (Ree, Carretta, & Teachout, 2015) as well as their similarities and differences (Campbell, 2015).

Performance on Work Samples

Work sample tests are hands-on simulations that can be used with applicants who already have the declarative and procedural knowledge to perform job tasks. They have a 100-year history in employee selection. For example, Münsterberg (1913) described two different work sample tests for selecting drivers and ship pilots. Work samples' criterion-related validity was examined in multiple meta-analyses. Hunter and Hunter (1984), using data from Asher and Sciarrino (1974) on verbal work sample tests, reported a validity of $r = .55$ for predicting training and $r = .45$ for predicting proficiency. They also reported validities of $r = .45$ and $.62$ for predicting the same criteria when motor work sample tests were used. Schmitt et al. (1984) reported that work sample tests predicted job performance ratings (observed $r = .32$, $k = 7$, $N = 384$), achievement/grades (observed $r = .31$, $k = 3$, $N = 95$), and wages (observed $r = .44$, $k = 4$, $N = 1,191$). Roth, Bobko, and McFarland (2005) updated the earlier meta-analyses and found that the operational validities for job performance were lower ($r = .33$, $k = 54$, $N = 10,469$). This is likely because the task content of jobs is becoming increasingly complex and multidimensional, leading work samples of a limited set of tasks to be deficient in their criterion construct

coverage (Campbell & Wiernik, 2015). Roth et al. also examined relations with cognitive ability and revealed that work sample tests correlate $r = .32$ with general cognitive ability (corrected correlation $r = .38$). As such, work sample tests display incremental validity over cognitive ability tests, but their lower validity in more recent decades is concerning. Research should examine additional reasons for the apparent decline in validity.

CONCLUSION

Personnel selection research has evolved over the past century from a focus on developing predictors that can be used to select employees to an emphasis on the theoretical understanding of predictor–job performance relationships (Viswesvaran & Ones, 2010). This evolution parallels what Schmidt and Kaplan (1971) described as a change from prediction and proving utility to one of scientific understanding (as a field matures). This evolution or progress is reflected in the calls for more focus on predictor constructs – at least to distinguish between methods and constructs in selection predictors (Arthur & Villado, 2008). Some handbooks in IWO psychology, especially those focusing on personnel selection, have included chapters only on predictor constructs (Farr & Tippins, 2010, 2017). On the other hand, other handbooks in personnel selection (cf. Schmitt, 2012) have included sections on predictor constructs and sections on predictor methods (with multiple chapters in each section). In this *Handbook*, we have included separate chapters for traditional predictor constructs (cognitive abilities, personality, interests) and have focused this chapter on method-based predictors that are also commonly considered for inclusion in selection systems. We have reviewed criterion- and construct-related validity of methods associated with acquiring information from individuals' backgrounds (e.g., educational credentials, experience indicators, biodata, credit checks, and the like), performance in interviews, and performance during lower- and higher-fidelity simulations.

We will close this chapter by raising two issues that are relevant to all predictor method groups we have covered here. First, personnel selection is an *applied science*. We cannot base our science of employee selection on data from student samples and measures that see little use beyond research settings. The empirical data from real-world job applicants taking proprietary measures must be publishable in our journals and included in meta-analytic databases to realize the full potential of our IWO research to inform practice (Ones, Viswesvaran, & Schmidt, 2017). There are many challenges to realizing this potential (see Ones et al., 2017, for a fuller exposition of the issues), but

we must surmount them if we are to be successful as scientist-practitioners.

Second, scoring many of the methods reviewed here involve observer and rater judgments. To be sure, each observer and rater has idiosyncrasies. But the goal should be to create and institute systems that are resistant to rater idiosyncrasies. If we are interested in assessing employee performance in a selection assessment that is not idiosyncratically defined by one interviewer or assessor at one point in time with a specific set of questions, we need to increase the reliability of selection systems by using many, many observers and raters. In order to evaluate the potential of such selection systems, corrections to predictor unreliability using interrater reliability estimates are essential (Viswesvaran et al., 2014).

Throughout this chapter we aimed to point out future directions for research in each area we covered. For example, the spectrum of work criteria for which validities are available continues to be limited. For most predictor methods, we have estimates of criterion-related validities for overall job performance and task performance, but not much beyond that. General performance criteria, such as citizenship behaviors and counterproductive work behaviors, as well as specific criterion domains, such as absenteeism, turnover, customer service, innovation, and employee green behaviors, await investigations. Similarly, optimal ways of combining predictor constructs and methods require empirical examinations. Differential validity and fairness of predictor methods are yet to be examined as well.

We see the topics of aging workforces, globalization, and technological innovations as pushing the frontiers of staffing. The pace of change is fast. Forces in scientific journals that prohibit sharing of field-based discoveries are strong (Ones, Kaiser, Chamorro-Premuzic, & Svensson, 2017). Development, deployment, and discoveries around psychometrically sound and strong selection methods may be on the shoulders of IWO practitioners. But strong research into shinier and newer objects of selection (e.g., use of digital footprints, mobile sensors in hiring; Chamorro-Premuzic, Winsborough, Sherman, & Hogan, 2016) will benefit from the involvement of academics and peer review. This is what we must do to lay the foundations of employee selection for the next century.

Notes

- 1 Small portions of this manuscript are based on the chapter 'Predictors used for personnel selection: An overview of constructs, methods and techniques' by Salgado, Viswesvaran, & Ones in the first edition of this *Handbook* (2001). We thank our current and former graduate students for stimulating our thinking about alternative methods for measuring

key constructs. We thank Brenton Wiernik for his assistance with the copyediting of this manuscript.

- 2 For all criterion-related validity coefficients, if the original source reported correlations corrected for predictor range-restriction and/or criterion unreliability, we report these. Otherwise, we report observed correlations.

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Judgment and Decision Making in Staffing Research and Practice

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INTRODUCTION

For the past century, the science of personnel selection has largely focused on measuring the correlation between predictor measures and measures of job performance. Obtaining a non-zero correlation is generally taken as evidence that the predictor is useful to organizations. Primary studies, meta-analyses, and summaries of meta-analysis report correlation estimates. More elaborate studies discuss incremental predictive validity based on regression analyses and present information across multiple measures of job performance. This literature has led to the development and vetting of many different variables and led to major advances in measurement of intended constructs (e.g., Sackett, Lievens, Van Iddekinge, & Kuncel, 2017). However, the field is increasingly recognizing that the real question of interest is, ‘Do better people get hired?’ and not, ‘Are predictors correlated with criteria?’ Here I argue that another approach, one focused on the intersection between applicant and hiring decisions, is needed to take the field forward and understand how and when better people get hired. I adopt this position because the traditional predictor criterion correlation approach often does not fully answer the questions of interest and can even be misleading. Put plainly, criterion-related validity evidence

does not demonstrate that better people are getting hired. Criterion-related validity is relevant and sometimes necessary but it is not sufficient evidence of selection system success.

To illustrate the concepts and issues (and hopefully peak the reader’s interest), I first present a series of hiring scenarios where favorable validity and incremental validity evidence is not consistent with the quality of people who get hired. This is used to explore how judgment and decision making influence hiring and should be incorporated in our work on personnel selection. I then present the Lens Model as an alternative framework for better evaluating both applicant and hiring decision making and conducting experiments on hiring decision making. Finally, I present a new taxonomy of hiring decision-making situations with the hope of providing structure for future work. Applying a decision-making perspective is an important shift if for no other reason than the fact that criterion-related validity evidence is, in fact, no guarantee that a new personnel selection system has led to better hires. It is also important because focusing on decision making will lead us to more carefully consider other factors in the development, implementation, and study of staffing systems.

Before we begin, I should address some broader issues. First, I am not looking to point fingers as I have also focused on the traditional approach in

our selection work (e.g., Kuncel, Hezlett, & Ones, 2004; Kuncel & Hezlett, 2007). In fact, the deeper decision-making problem crept into my mind as a result of this work. A university colleague rejected a PhD applicant with some great credentials (high admissions tests scores and great grade point average [GPA]) because the applicant was ‘just one of those smart people’. In other words, scores with positive criterion-related validity were negatively related to admission, at least in the extreme end of the range. A lot more is happening on the ground than our meta-analysis on test validity captures (i.e., Kuncel, Hezlett, & Ones, 2001).

Second, I don’t claim to be the first to raise some of these issues or be a lone advocate for considering decision making. This chapter is built on numerous important studies which will be woven into the review and my hope here is make a strong case that more is needed grounded in a different perspective. A great deal of important behavior in organizations comes down to judgment and decisions and I agree with both Dalal et al. (Dalal, Bonaccio, Highhouse, Ilgen, Mohammed, & Slaughter, 2010) that it needs to be taken seriously and MacIver et al. (MacIver, Anderson, Costs, & Evers, 2014) that user validity needs to be considered.

Third, the existence of some research on decision making in staffing might lead to an accusation that this is a straw man argument. I don’t think so. The traditional validation approach is ingrained in everything including excellent introductory textbooks (Landy & Conte, 2016), influential book chapters on selection (Salgado, Viswesvaran, & Ones, 2001), and heavily cited (3000+) reviews of job performance predictors (Schmidt & Hunter, 1998). Indeed, a recent review of criterion-related validity evidence (that is both thoughtful and deep) argued ‘the primary inference of concern in an employment context is that test scores predict subsequent work behavior’ (Van Iddekinge & Ployhart, 2008, p. 873). The position here is that in an applied setting it is more important to establish that they actually lead to making good decisions and hiring better people. Currently, cataloging criterion-related validity takes center stage while decision making is, at best, a sideshow. The situation needs to change.

The following scenarios represent situations where the traditional approach breaks down. Each of these reflect a situation where attention to who gets hired is more illuminating than correlational evidence which can be genuinely misleading. In all cases there are implications for conducting better validation work and potential directions for research and theory development.

HIRING SCENARIOS

Scenario 1: Cassandra Problem

You have developed a new predictor and scores from the predictor demonstrated a moderate correlation (based on large N) with a carefully constructed measure of job performance. Often this is where we stop. Technical reports are full of these correlations, but is this enough? Does this evidence demonstrate a useful tool? Not in this case because scores on the predictor are uncorrelated with who is actually hired. This is the Cassandra problem, after the mythological Greek prophet who was gifted with perfect prophecy but cursed never to be believed. Sound familiar? Hiring managers may not believe our predictions or decision aids for a number of reasons. They may hate the tool because they perceive it as going against tradition, sapping their autonomy, being terribly confusing, requiring too much work, or simply saying ‘that doesn’t look like what good workers do’. Face validity can take on a new importance when we consider hiring decisions. Ultimately, how scores are related to hiring decisions is of equal importance as predictor/criterion correlations.

If the decision makers base decisions on another approach with no predictive power, the average performance of the hired group (those who start work) is the same as the average performance of the applicant group (those who apply), even though subsequent analysis would show a moderate correlation between the new predictor and job performance. Ironically, the lack of range restriction in this scenario enhances the likelihood of obtaining a favorable criterion-related validity correlation. If decision makers base hiring decisions on something with some validity, the hired group would have higher average performance than the applicant group, but at a level lower than if the Cassandra problem had not occurred. In any case, this scenario actually illustrates *disutility*. Time and money are spent on the hiring system that is not used to improve performance. Overall the system costs the organization money with no benefit. Unfortunately, this effect is probably not mythology as the reluctance to use valid decision aids is fairly widespread (Rynes, Bartunek, & Daft, 2001).

Scenario 2: Clean the Augean Stables

A consulting firm develops a new predictor to augment the existing hiring system. Subsequent analysis reveals that both the original hiring system and the new predictor are correlated with a

good job performance measure. Multiple-Regression software is fired up and indicates that the new predictor has no incremental predictive power. The sample was large enough that it is hard to argue the results are due to sampling error so it is recommended that the new predictor be set aside. Is this a safe conclusion? It might be in some cases, but it turns out in this case that the new predictor reduced reliance on irrelevant information yielding better hiring decisions. With a redundant predictor added to the mix, the average performance of the hired group goes up compared to the original hiring system even though there is no increase in criterion-related validity. It is the decision quality that improves, not the correlation between new predictor and criterion. Essentially this is similar to cleaning the Augean stable, after Hercules cleaning a dirty stable of 3000 oxen which has not been cleaned for thirty years by diverting two rivers through it. Duplicate predictors are a hit, by cleaning out the ... waste.

Research does suggest that the mere format of the decision aid influences hiring judgments (Lievens, Highhouse, & De Corte, 2005; Topor, Colarelli, & Han, 2007). Although there is some inconsistency in this small literature, it suggests that the packaging and presentation of the measure, even focused on the same construct, can influence who gets hired. Face validity is often mentioned as an aside and yet the appeal or perceived legitimacy of a measure seems to matter.

Scenario 3: Fool's Gold and Shiny Distractions

A quick computer-based simulation was added to a solid existing hiring system. It elegantly measures an infrequently used but important skill that, according to managers, 'kids these days just don't have'. Subsequent analysis reveals that it is not strongly correlated with overall job performance but it does add a bit of incremental predictive validity of arguably practical significance in a multiple regression. Because of its modest cost, the organization decides to continue using it because it helps. Should the organization do this? Perhaps by now readers may have noticed a pattern and are guessing, 'Maybe not?'. You are right. In this case, the strong face validity of the simulation makes it an overly attractive predictor which has reduced the typical weight decision makers give to other more effective predictors.

This effect is likely to occur and could become more prevalent if computer-based simulations become popular. Similarly in my consulting experience, organizations sometimes want to create

measures of personality so they can abandon (or minimize) cognitive ability tests. Gamification of assessments and increasing use of fancy narratively rich media in testing makes this scenario an increasing possibility. People can be overly influenced by information with high narrative characteristics (e.g., Winterbottom, Bekker, Conner, & Mooney, 2008). The simulation scores crowd out other more valid predictors and the average performance of the hired group declines compared to the original hiring system despite a seemingly useful delta R^2 .

A small amount of research suggests that this may be particularly true when interviewers are part of the final decision-making process (Kahneman, 2011). Some evidence suggests that those involved in data combination should avoid being involved in the interview and should instead rely on information provided by a separate interviewer. They should do this because they tend to focus excessively on their experiences from the interview to the detriment of the overall decision. Note that this recommendation runs counter to nearly every hiring system and professional assessment. However, it is argued that directly experiencing the richness in interviews tends to overwhelm effective consideration of other information, a finding consistent with the overall literature on decision making. Instead the final decision makers should allow others to conduct a structured interview and then consider these results in the hiring decision. It is reasonable to assume that other assessment tools with strong narrative qualities (e.g., leaderless group discussions, role plays) may have similar effects. We have some evidence that unstructured job interviews, when used by decision makers can actually harm decision quality even though a statistical analysis would reveal that they add some incremental validity (Kausel, Culbertson, & Madrid, 2016). Many validation studies that do not examine decision quality will miss this issue.

Scenario 4: The Ones that Get Away

A predictor yields a strong correlation with good measures of job performance but all is not well again. But why? The best applicants don't accept the job offer, choosing to go elsewhere. Consistent with work by Murphy (1986) the best applicants may be far more prone to decline the job offer and go to competitors. The average performance of the hired group compared with the average performance of the job offer group would help reveal that those who accept are not quite as good as those who get an initial job offer. Unfortunately, criterion-related validity only reveals that the hiring system differentiates among the applicants who accept the job (the mediocre applicants in

this case) and gives no insight into the fact that the best applicants go elsewhere.

Of course, this effect may be due to factors outside of the hiring system including job location, pay, benefits, and the organization's professional prestige. However, first impression experiences during the hiring process can affect how people feel about the position (Hausknecht, Day, & Thomas, 2004) and current validation efforts are not informative on these issues. Perceptions of injustice or intrusiveness could yield a rejected job offer. All being equal, we would expect that the most desirable applicants are also the most likely to have other options.

Instead, considering the average performance of the incumbent group can be compared with the average predicted performance of both the applicant group as well as the job offer group to reveal this problem. Examination of predictor standard deviations will only reveal that the incumbent group is more restricted than the applicant group and may convince us that the system is working for us. If experiences with the selection system features are contributing to rejected offers then it is partially working against us.

Scenario 5: Recruiting Lilliputians among Giants

Imagine that a strong criterion-related validity is obtained and issues with the above scenarios are addressed. The best applicants do accept job offers with some frequency. Is it safe to be pleased? Again no, because the best people from the population of potential applicants may not even bother to apply. The system selects the *very best mediocre* workers. This is because not everyone is at the party. The nature of the applicant group can be plausibly affected in a number of different ways for better or worse. Weaker applicants may be discouraged and apply in smaller numbers. Similarly, the best applicants could be attracted in greater numbers. Random selection conducted in a strong applicant pool can result in better hiring decisions (a superior incumbent group) compared to effective selection in weak applicant population. Overall, self-selection effects will influence the average performance of the hired group to the extent that the self-selection occurs in score ranges that have some chance of influencing who gets a job offer and is hired.

This is not just speculation. Kuncel and Klieger (2007) examined law school applications where the reliance on decision aids and organization prestige are very transparent to applicants (applicants have good information about their market

value and know the status of the law schools). Application patterns for aspiring law school students are related to each school's reputation and the applicant's college GPA and LSAT (law school admission test) scores. Applicants heavily targeted their applications at the most selective schools that were also likely to admit them. The most qualified applicants almost exclusively applied to tier 1 and tier 2 schools, while the least qualified applicants heavily applied to the least selective schools. Law schools were selecting the best students among a pool that was largely already matched to their prestige level. Put another way, much of the selection work was done by the applicants through their decisions. The only exception was that the most elite schools received applications from a wide range of applicants including prospective students who had effectively a zero probability of being accepted. Hope springs eternal.

Already some hiring decisions are already fairly transparent to applicants (Kuncel & Klieger, 2007) and with increased sharing of information online, self-selection effects for organizations are likely to increase. Applicants are warned about drug screening for some jobs likely causing many to self-select out. Again, this information is not tracked in traditional validation work. Knowing the likelihood of acceptance is just one possible factor that can influence the decision to apply.

Scenario 6: Wicked Oracles

A carefully constructed set of predictors is collected and the information from them is combined to make an overall hiring judgment. Subsequent analysis of the predictors indicates that they are all good predictors and a multiple regression suggests that combined the whole is far greater than the sum of the parts. The multi-measure assessment is declared a big success. Yet this cannot be concluded with the current information. The correlation and regression analyses are not based on the decision, they are based on the information that informed the decision, and the two are by no means the same.

The predictive power of a decision from an expert is often found to be worse than what is obtained from a regression analysis or even unit weighting of all information and this has been known since 1954 when Paul Meehl published his groundbreaking review. Years of subsequent research has confirmed this (Grove, Zald, Lebow, Snitz, & Nelson, 2000; Tetlock, 2005) and is also the case for both hiring and admissions decisions (Kuncel, Klieger, Connolly, & Ones, 2013). It appears the worst case scenario for experts is

when predictors are not highly correlated with outcomes and feedback is often poor and ambiguous. These situations have been labeled ‘wicked’ by Kahneman (2011) and characterize all judgment-based hiring and admissions decisions. In hiring, therefore, experts are in the wickedest of situations when the expert is an external advisor who uses information that is not strongly correlated with subsequent performance (i.e., psychological variables) and good information about the applicant’s subsequent performance is inconsistent and of poor quality. Sound familiar? Regression analysis across predictors or dimension scores will not reveal this issue.

Here we can expect that the criterion-related validity of the hiring system will be less than what would be obtained using properly constructed differential weights or even unit weights in many cases. However, the story does not end here. Although the traditional approach reveals that algorithmic data combination is superior it does not mean that algorithmic data combination results in superior decisions. Given a preference by many for holistic judgments, despite their known weaknesses, a hiring manager may actually make more use of an inferior but valid decision aid that they trust, compared to the algorithmically combined decision aid. In other words, it is possible for an algorithmic system to result in worse decisions if the decision maker rejects it and focuses on cues that are less valid than what would be obtained using expert judgment. Consistent use of a less valid system can be superior to rejection of a more valid system. It’s the Cassandra problem all over and we know comparatively little about it. Some evidence suggests that individual differences affect how people react to different algorithmic hiring systems (Dietvorst, Simmons, & Massey, 2015). It is also reasonable to believe that how a data combination is presented will affect adoption. For example, modeling expert judgment may enhance adoption over seemingly sterile approaches like unit weights or regression analysis.

CONTEXT EFFECTS AND HIRING SYSTEM STRATEGY EFFECTS

Scenario 7: Satisficing and Settling

Someone good applies, but you don’t know if you want to reject them and wait for someone great. Given that the tails of the distribution are long and, in theory, go on forever when should you accept someone? More realistically, with any given applicant there is probably someone better out there. Is

the cost of waiting worth the cost of not having a new person now and the possibility that the person will become your competition? This much is a given, not all decision makers will make the same choice and those decisions may be influenced by the decision aids available to them. Do more face-valid aids make people more likely to wait when they should not? To the best of my knowledge we don’t know the answer, but we should.

Scenario 8: The Prom Date

A lot of people didn’t ask the most attractive and popular person to prom because they believe there is a near zero chance that person will accept (perhaps I’m just projecting). The same thing likely happens in hiring decisions and certainly happens in admissions decisions. In consulting with a top 20, but not top 5, engineering program the faculty acknowledged that there were applicants they simply didn’t pursue because the applicant was too amazing. They weren’t going to win out over MIT for a Super-Duper-Star (a technical term) but might steal a Star from a program in the bottom 5 of the top 10. Since there are opportunity costs with admitting students who do not come, they chose to pass on the Super-Duper-Star. This decision choice will not be revealed in a validation study. And it is worth noting that it can be a very rational and performance maximizing strategy. That is, an effective selection system can help decision makers make a Prom Date decision correctly. They may get someone who is out of their league. Adopting a decision-making framework could inform if a Prom Date strategy was actually effective. Are applicants near the cutoff less likely to accept? Is the cutoff efficient? What else affects the applicant’s likelihood to accept despite being somewhat out of your league? For organizations in a dog fight for a very small pool of top talent, these questions are important.

Scenario 9: Good First Impression

An underutilized but valid predictor is given a face-validity face-lift and made more appealing. Although there is no radical change in the underlying construct being measured, it is now a far more face-valid predictor. The criterion-related validity does not change nor do other considerations like adverse impact. Effort wasted? Not necessarily, a better hiring system may encourage more applications and acceptances among those offered the job. The appealing nature of the hiring system elicits favorable applicant reaction and perceptions among

applicants, even among those who are rejected. This information is shared on job websites and more applicants apply as a result. The selection ratio improves and the average performance of the hired group be expected to rise. The decisions of the applicants reacting to the system make the system more effective in a way that will not be captured by correlational validity analysis. Some organizations (e.g., Google) get a great deal of free publicity for their hiring efforts. Are high tech focused applicants enchanted by this? Are more skilled workers more likely to apply and accept as a result?

Scenario 10: Decoys and Phantoms

An effective hiring system has resulted in a short list of top applicants. The top two candidates stand out and the best candidate is selected on the basis of their merits from these two. But is it as rational as this? Not necessarily. We know that sometimes this decision is as much the result of other lesser candidates than the two key applicants. Decoy effects have been demonstrated in several studies (e.g., Highhouse, 1996).

Experiments in selection decision making have demonstrated the disconcerting effect that different people will be given a job offer depending on the characteristics of the *other* people in the final applicant pool. Other people who are considered but never actually given an offer. A decoy is a job candidate who is close in quality but inferior or tied to another candidate on all characteristics. A phantom is superior on a characteristic to other applicants but is now unavailable (e.g., accepted another job offer). Generally, decoys tend to attract attention to other candidates who fully dominate them on all

characteristics. Consider Table 16.1 which displays both decoy effects and phantom effects. In all cases, we are concerned with who is favored depending on the presence of different Decoys or Phantoms. Decoys are other weaker applicants who are present in the pool. The Decoy's scores influences which stronger candidate gets selected. People tend to pick the stronger applicant who is equal or better than the decoy on all characteristics. There is no reason to favor A or B in the Decoy examples and it appears that people allow the information from the Decoy C to influence their choice.

The Phantom scenarios turn this on its head. In the Phantom scenario, arguably the best applicant (the Phantom) is removed from consideration by telling decision makers the applicant took another position. The scores of the Phantom influence which of the remaining candidates is selected. Generally decision makers seem to try to select a backup candidate whose scores follow the same pattern or configuration of the Phantom.

Decoy effects also appear to occur when groups are making decisions as well. In many cases, the hiring decision is made by a group or by an individual with group input. Slaughter et al. (Slaughter, Bagger, & Li, 2006) found decoy effects for both individual decision makers as well as groups. Results suggested that, if anything, the decoy effect on decision making is stronger for groups than individuals. In all cases the key point is that people are not making top-down rational decisions. Alarming, who they chose is influenced by people who are never going to get a job offer!

Assuming the selection system is well designed and used these final choices are likely to have more minor effects than other decision errors (Kuncel, 2008) but are still important. Their existence raises important questions. Are there measures that tend

Table 16.1 Examples of decoy and phantom effects

Decoy Effect Example			
Job Candidates	Predictor 1	Predictor 2	Decision Result
A	High	Average	Preferred with Decoy 1
B	Average	High	
Decoy 1	High	Low	Preferred with Decoy 2
Decoy 2	Low	High	
Phantom Effect Example			
Job Candidates	Predictor 1	Predictor 2	Decision Result
Phantom 1	5	90	
Phantom 2	8	57	
X	5	80	Favored with Phantom 1
Y	7	57	Favored with Phantom 2

Note: Table adapted from tables and examples in Highhouse (1996).

to enhance Decoy or Phantom effects? Do people rely on other invalid or biased information to break ties? Can we structure information in a way that encourages seeking additional information to break ties? What are the implications for diversity in hiring decisions?

DECISIONS, DECISIONS, DECISIONS

By now it hopefully is clear that there are multiple decision makers and decision points that affect the quality of the hired group. Figure 16.1 is an attempt to illustrate the major ones. On the applicant side there are at least four nested groups of decision makers.

The first is the applicant population which is composed of all of the people who might apply for the job. The second is the applicant group which is composed of those who actually applied. The third are the job offer group. These are the people who received a job offer which finally yields the hired group which is composed of those who accepted the job offer. People in each of these groups make decisions that can influence the ultimate performance of the hired group.

For the organization, there are several decisions that may or may not be made by the same person.

The first two are the decision of what information to consider in the hiring process and how to recruit. These decisions could be made by HR, the hiring manager, or a mix of influences. To the extent that the hiring process becomes known to the application population it can influence who will apply. The third hiring decision is how to combine the information. This can include using various group processes, an algorithm, or gut feeling. This decision will influence what decision aids are actually considered, how much weight each is given, and the variability of the decision process. The third and closely related decision is who, if any, gets job offers. This decision may be influenced by likelihood of acceptance and other factors noted above. Finally, if an offer is rejected, the decision maker will choose who to pursue next, if anyone.

THE LENS MODEL: A WAY FORWARD

Our goal should be to have a positive effect on the decision-making process of applicants and hiring decision makers where a positive effect increases the average performance of the hired group. To understand these decisions, I suggest adopting the Lens Model – a powerful framework for thinking

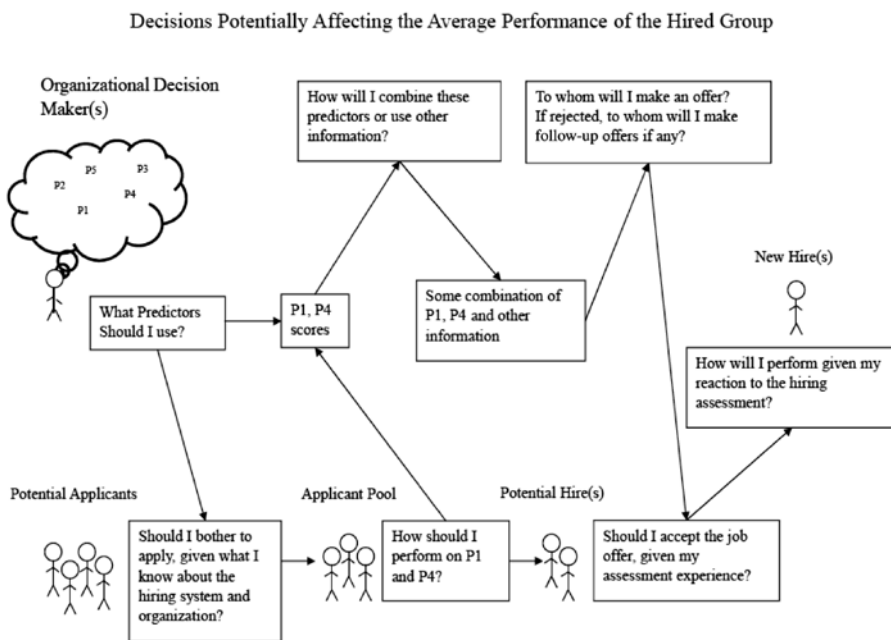


Figure 16.1 Decisions potentially affecting the average performance of the hired group

about hiring decision making (Hammond & Stewart, 2001; Karelaia & Hogarth, 2008). This model has been extensively used for decision making in many settings but has been infrequently applied to hiring decisions (with some notable exceptions including Gifford, Ng, & Wilkinson, 1985; Kuncel et al., 2013). It is simple, elegant, and flexible, permitting answering complex questions about the nature of judgments and what influences them. Further, the Lens Model can be applied to both experimental data and observational data.

The Lens Model begins at the top level with three major pieces of information. First are the cues. Cues are the pieces of information in the environment that could be used by a decision maker. Cues can include verbal behaviors during interviews, tests scores, résumé information, applicant gender, or how stylishly the applicant dresses. The model provides information about how heavily each of these cues are weighted by judges in forming the second key piece of information, the decision maker's actual judgment. In a hiring decision, we might discover that decision makers put comparatively more weight on their interview ratings than on other pieces of information about the candidate when rating applicants on their fit to the job. Finally, there is the outcome or criterion of interest. Here the model provides information about how the cues are related to the

outcome and how strongly the judge's prediction is related to that outcome. This allows us to compare how the cue information could have been used compared with how it actually was used.

It's worth noting that the effect of situational or experimental manipulations on judgment weights can be examined in this framework. How does assessor frame of reference training affect cue weights? Does coaching interviewees affect how judges evaluate them? Further, analyses can be conducted to compare individual judges or groups of judges. How does *this* judge weight the information compared with *that* judge? Do new assessors emphasize some information more than more experienced assessors depending on interview region? These and other questions can be examined using an HLM framework (Schilling & Hogge, 2001) rather than traditional regression analyses. Isn't this cool?

Figure 16.2 displays the major elements of the Lens Model and the statistics that are calculated to answer questions about the decisions of the judge. A small tour of the model is in order combined with some common results. As noted above the information we begin with is usually the judgments or decisions, the information or cues, and the outcome or criterion. Usually the first step is to regress the cues onto the judgment and to regress the cues onto the criterion or outcome. We obtain several pieces of information. We obtain predicted

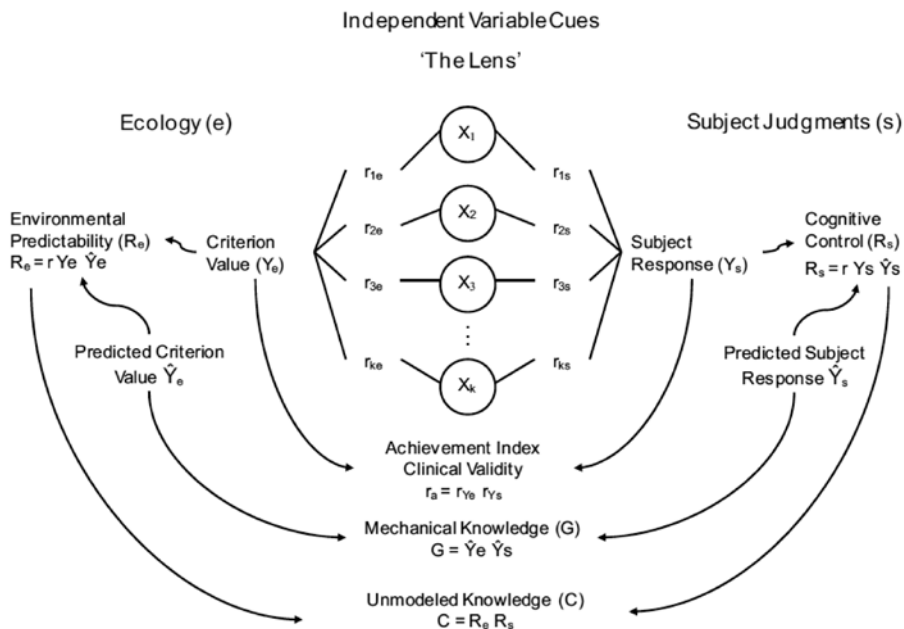


Figure 16.2 The Lens Model

values on both the ecology and judgment sides. We learn how cue information is weighted on both sides of the model.

Regressing the cues on the criterion values should be familiar in typical criterion-related validity studies but the Lens Model lets us do more with this information. First, we have an estimate of Environmental Predictability (R_e) which is the correlation between predicted criterion scores and actual criterion scores. That is, just how well can we predict the criterion given the cues? Similarly we can examine the correlation between the experts' predicted judgments and their actual judgements (R_s) which is sometimes called Response Consistency or Cognitive Control (Hammond & Summers, 1972). This gives us information about how predictable the experts' judgments are from a linear model of the cues. Often this value is fairly large.

The next step is usually to look at the Achievement Index which is just the correlation between the judgment and the criterion. A judge can have stronger achievement than the environmental predictability if they can use configural or nonlinear policies that are not captured by the model.

Now we start to get into some interesting statistics that are not a part of traditional criterion-related validity studies. The first is the Matching Index (G) which is the correlation between the predicted scores for the judge and the predicted scores for the criterion. This relationship is often described as the judge's knowledge of how the cues are related (linearly) to the criterion. G can be large, however, even in cases where the actual weights obtained do not match particularly well. This occurs when cues are highly intercorrelated so weighting some more strongly than others functionally has little effect on predictions. In other words, in some situations different weighting schemes can result in very similar values. One example would be different weighting schemes for a set of highly intercorrelated ability tests where weighting this test or that test more can often have little effect on the resulting prediction (although there are notable exceptions; Sackett, Walmsley, Koch, Beatty, & Kuncel, 2016).

The correlation between the residuals from the judge's model and the environmental model are often examined in the Lens Model and are simply called C . In the Lens Model, C is often referred to as Unmodeled Knowledge and can be thought of as insight or information the decision makers have that is not captured in how their judgment is related to cues and is not captured in how the cues are related to the outcome. A large C is an invitation to explore other explanations for how and what the decision makers are considering.

This can include cues not included in the model, configural use of information, and nonlinear use of information (e.g., too much social dominance).

Finally, the product of the Matching Index (G) and Cognitive Control (R_s) on one hand and the Matching Index (G) and Environmental Predictability (R_e) on the other. Looking at GR_s we have an estimate of what is sometimes called Linear Cognitive Ability or, simply, Performance. It captures how much the expert contributes to achievement. It is used as a measure of being consistent in making decisions and having an appropriate strategy for making those decisions. Switching to GR_e we quantify the effectiveness of the average strategy for the expert. This is sometimes called a Bootstrapped Model or Model of Man approach in which we replace the decision maker with her strategy. Often this results in better prediction than the expert on which the model is built because it is applied consistently.

Three details need to be added here. First, note that cues do not need to be things the judge claims to value or ignore. They can be anything of interest in the environment that could plausibly affect the judge. Second, it is not necessary to have outcome data to look at interesting questions. For example, 'how much variability is there in the policy of the judge?' or 'do policies differ by experience?' are both interesting questions. Finally, this approach can also be used to examine interventions like training programs, instructions for decision makers, or visual versus text information displays. Overall, the Lens Model is a useful tool for examining several of the scenarios here and working toward a better understanding of how decision makers use information.

A NEW FRONTIER IN FORECASTING ACCURACY

Although algorithmic combination of predictive data consistently outperforms human judgment, there are situations where valid cues have not been well established and equations have not been developed. A recent large-scale study has numerous implications for prediction in selection. Research reported in a journal (Mellers et al., 2015) and a book (Tetlock & Gardner, 2015) has examined forecasting accuracy for more unusual events and have identified a group, set as the top 2%, who consistently outperform other forecasters and are called 'superforecasters'. In the study, forecasters attempt to predict specific time-bound geopolitical events. Questions were posed like, Who will be the next president of a specific

country?, What will be the average price of oil in the United States in 4 months?, How much will the economy grow in India over the next half year? Forecasting tournaments, 3 in all, were run with volunteers of the course of 4 years. After year 1, forecasters were stratified into small teams (e.g., elite) based on past performance.

Superforecasters were, on average, reliably better at making more accurate predictions like these than others. Their forecasting accuracy also extended farther out into the future than regular forecasters. However, the authors also concluded that beyond a certain point, about one year, forecasting was not much more accurate than chance. Interestingly, Superforecasters also got better at making forecasts with practice. The better forecasters got better over time while many of the other participants demonstrated no improvement in their accuracy over the course of the study.

Accuracy of forecasting was predictable, to a limited degree, by individual difference characteristics. As seen in Figure 16.3, several cognitive ability measures are modestly correlated with accuracy. In addition knowledge measures (political knowledge) are also related to accuracy, again weakly. A person's motivation to be the best was correlated, as were open-mindedness and need for cognition. Superforecasters appeared to be better at managing their reasoning and treated their beliefs as open to testing. Perhaps as a result of their care, they were less susceptible to scope insensitivity, a classic and pernicious bias. Yet even the Superforecasters were partially affected by scope insensitivity in a

controlled but real-world forecasting experiment conducted by the authors.

Behaviorally, Superforecasters were more active and engaged in their groups, commenting and posting more than other forecasters. Superforecasters also updated their forecasts more regularly suggesting that they were both more motivated and attending to new information as it became available. Although differences in activity were some of the best single predictors of accuracy, they still had important but modest correlations with accuracy (approximate .20).

The Tetlock and Gardner book and Mellers et al.'s (2015) studies are clearly important for work on understanding hiring decision making. However, the forecasting tournaments differ from hiring decision making in several ways that need to be considered before we rush to identify hiring Superforecasters. First, the validity of different cues is known for hiring. We have extensive research documenting the predictive power of many measures. The need for someone to sift the information is less present in hiring decision making. Second, the geopolitical events in the study differ from many hiring decisions. Forecasters are making time-bound predictions about the cumulative actions of many people or countries rather than attempting to differentiate between individuals. Third, forecasters are receiving unambiguous and timely feedback on their forecasts. This is not the case for most hiring decision makers.

Some hiring decisions may be more like the geopolitical forecasts. For example, a prediction might

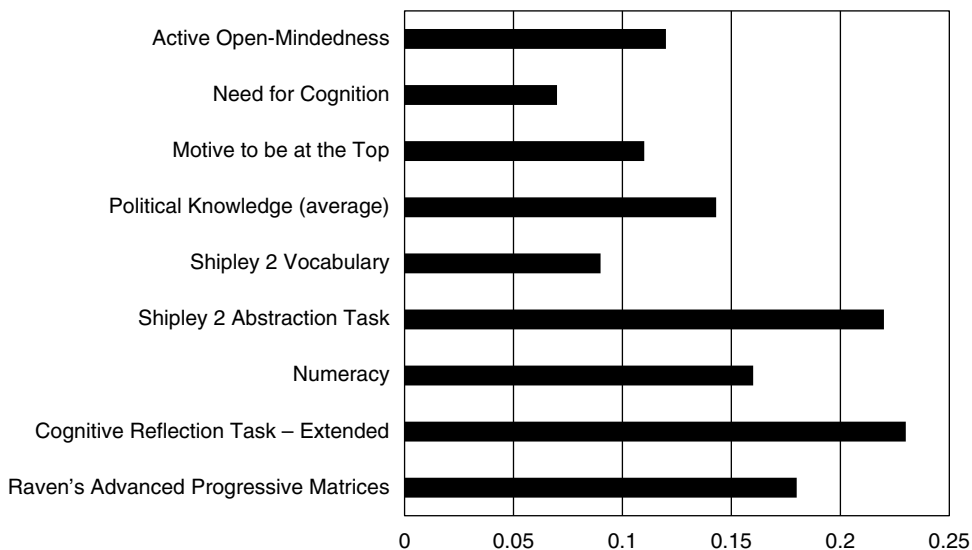


Figure 16.3 Individual difference correlates of Superforecaster predictions

be made about how a top leader would function given factors like the new direction for an organization, or how an organization is planning to strategically react to a crisis, or how a new board of directors is likely to interact with a new CEO. The accuracy of forecasts made by psychologists or other experts in such situations would be a fascinating topic for study. To provide useful and legitimate information, outcomes would need to be very carefully specified in advance and time-bounded for evaluation. Experts would need to provide specific probabilistic or quantity predictions. Finally, many such forecasts would need to be collected to have enough information for analysis. It is our hope such a forecasting study will be conducted but we know of no such information at this time.

A TAXONOMY OF HIRING DECISIONS²

Hiring decisions are made in a number of different ways based on a wide variety of data. An overall theme of this chapter is the need to consider the many different ways people use information in making hiring decisions. Toward that end, a taxonomy of hiring decisions is presented with the hope of stimulating discussion and organizing our thinking.

Decisions can be made by individuals, groups, or be based on algorithms including everything from simple unit weighting, expert-based weights, empirical weights, or even bootstrapped decision weights. Both acceptability and decision quality are likely to be influenced by both and so I offer a preliminary taxonomy of cue types and cue combination methods. We can start with Sawyer (1966) who made the important distinction between how data are *measured* and how they are *combined*. He argued that data can be measured clinically, mechanically, or both. In turn this freshly gathered data can then be combined either clinically, mechanically, or both which he labeled a synthesis. A clinical measurement with mechanical combination might be a set of judgmental ratings from a panel of clinicians that are subsequently summed to produce a final score. Of course, this distinction is not perfectly clean and there are situations where human judgments are made in a structured and proceduralized manner that resemble a mechanical method (e.g., a highly structured interview).

Sawyer created 8 different categories based on how the data are measured (clinical, mechanical, both) and combined (mechanical or clinical). He also included two additional categories, a mechanical synthesis and a clinical synthesis.

The synthesis category is defined as the situation when one method of data combination (mechanical or clinical) is used to inform the other. In a clinical synthesis, the mechanically derived decision is given to the judge to use in addition to the other information. For example we might hand a psychologist test scores, interview ratings, and an in-basket score *plus* the total average percentile rank score across all assessments. This permits the clinician to see what the equations generate and then use judgment and interpretation of all of the available data. In a mechanical synthesis, a clinical judgment based on all of the data is added to the scores, tests, and ratings all of which are combined mechanically with all of the other information. The mechanical synthesis is effectively letting the expert have her say along with the available information. This approach works to capture the expertise of the clinician while not losing the reliability and consistency of a mechanical method. Both synthesis methods attempt to capitalize on the strengths of the other method. They align with the Lens Model research in that mechanical methods are very consistent while a clinical judgment has the potential to capitalize on unusual cues or configural combination methods that are observed and developed by the clinician but not captured by the actuary.

Unfortunately, Sawyer is lacking three categories I view as important. First, he did not distinguish between the situation where an expert is measuring information purely impressionistically versus data measurement that includes the elements of structure and standardization that have become important standards in psychological assessment. Second, mechanical methods are all combined without differentiating between unit, differential weights (either empirical or expert), or bootstrapped weights. Although in some situations differential weighting will make little to no difference in accuracy, the use and reliance on different types of weights may be great. That is the hiring decisions made with different types of weights may differ considerably as decision makers may not trust all weighting schemes equally. Finally, group decision making was not included in Sawyer's taxonomy and given its importance and prevalence it should be included. Therefore, an attempt at an improved and expanded taxonomy of data measurement and combination methods is presented in Table 16.2.

Two changes have been made on the measurement–method axis. An impressionistic method has been added and clinical has been renamed to standardized clinical to help differentiate it from impressionistic. Impressionistic refers to those situations where a judge does not follow any standardized protocol in obtaining

Table 16.2 Taxonomy of data combination by measurement methods

<i>Measurement Method</i>	<i>Data Combination Method</i>				
	<i>Clinical</i>	<i>Group Judgment^a</i>	<i>Unit-Weighted Mechanical</i>	<i>Criterion-Derived Mechanical Weights^b</i>	<i>Bootstrapped Weights</i>
Impressionistic	Interview	Unstructured Panel Interview	NA ^c	NA ^c	NA ^c
Standardized Clinical	Structured Interview	Assessment Center	Trait Ratings	Weighted Trait Ratings	Bootstrapped Ratings
Mechanical	Profile Interpretation	Panel Review	Mechanical Composite	Weighted Mechanical Composite	Bootstrapped Composite
Both/Mixture	Diagnostic Judgment	Team Diagnosis	Rich Mechanical Composite ^d	Rich Weighted Composite ^d	Bootstrapped Diagnosis ^d
Synthesis	Clinical Synthesis	Group Synthesis	Mechanical Synthesis ^d	Weighted Synthesis ^d	Bootstrapped Synthesis ^d

Note: ^a Group Judgments can vary in terms of their structure ranging from high informal to nearly mechanical. Thus, each cell contains multiple decision-making situations. ^b Criterion-Derived Mechanical Weights is when weights are based on empirical results including regression, previous meta-analyses, or zero-order correlations. ^c X = this category, by definition, cannot exist. ^d In these mixture cases, only standardized clinical or mechanically gathered information can be used.

information. Generally no quantitative information (ratings) are produced and mechanical combination is not possible. Quantification of the impressionistic information involves the development of some procedures and moves the method toward the next type, standardized clinical. Descriptions and verbal opinions are the most that is produced, if at all, in impressionistic data gathering.

One example is the traditional job interview where a prospective employee talks with the hiring manager. Topics could range from previous work experience to preferred golf courses and the total structure is not much more than an opening question of 'Tell me about yourself'. The interviewer could make the decision herself or pass on written or verbal comments to another individual or group of people to make the decision.

Standardized Clinical is the situation where a clinical judgment is made, but it is made after following a structured and standardized protocol. Typically, some quantitative output is produced like a rating. For example, a structured interview where the same questions are asked of every person and the quality of the responses is rated. Most professionally developed structured interviews would fall into this category although these can and do differ in terms of how structured they are (Campion, Palmer, & Campion, 1997).

The data combination methods axis has been modified in three ways. The first two are the addition of the group judgment and bootstrapped combination methods. The group judgment combination method is when a group, working together,

clinically combines the data. The literature on group decision making is vast and beyond the scope of this chapter (Laughlin, 2011). I include it here for completeness and with the hope that others will thoughtfully expand on this category.

The bootstrapped combination method is a mechanical combination method where the mechanical weights are developed from clinicians' judgments, typically using linear regression (Goldberg, 1970). Predictor scores and cues are regressed onto prior ratings or judgments and the resulting weights are used. This approach is sometimes called a Model of Man approach to weighting information. It captures a typical weighting of information for an individual or across individuals.

The third difference is the splitting of the mechanical combination method into those where a simple unit weighted approach is used versus the situation where differential weights are obtained from either expert judgment or a criterion-related validity information. Weights can be derived based on theory or quantitatively depending on their relationship with a criterion of interest. The differential weights are similar to the bootstrapped weights except that the criterion used to develop the weights differ. Bootstrapped uses clinical judgments, while criterion developed weights use a sample of data with a measure of the actual event the outcome is used to predict.

The three mechanical approaches (unit, bootstrapped, differential) have been separated because of their different development methods and the historical importance of the bootstrapped method.

Ideally reviews should not lump together mechanical studies where very different methods were used to develop the weights. Wherever possible primary studies should examine all three. Although this may not matter much in many situations, the distinctions are clear, real, and can have an effect.

The group judgment combination method is likely to be the most confusing as the data gathering and data combination efforts are often confounded. An Unstructured Panel Interview is the situation where impressionistic information is combined through a group discussion. The data gathering and data combination methods are often confounded as the impressionistic information is typically gathered by the same panel that makes the final decision. A Panel Review would be the case where a potential hire takes a series of standardized tests and a panel receives the scores and makes a decision. This is similar to the Assessment Center except that only standardized clinical information is examined in the Assessment Center. Assessment Centers are defined very traditionally here where only simulations and interviews are evaluated in the Assessment Center. Unfortunately, this cell, like the Unstructured Panel Interview, often falls prey to having the data combination method mixed with the data gathering method. It is the unusual case where clinical judgments are made and then passed on to a completely separate group to make the decision. In many of these cases, most of the simulations are conducted and rated by the members of the final decision-making group, further blurring the distinction between the data gathering and the decision making (Spychalski, Quiñones, Gaugler, & Pohley, 1997).

The team diagnosis is the method where both quantitative and clinical information are combined by a group. An example of this would be university faculty deciding on admissions based on GRE scores, undergraduate GPA, personal statements, and letters of recommendation. A second example would be a medical team combining test information, exam information, and symptom information from the patient and written descriptions from the patient's history.

The development of this taxonomy may assist research and reviews and can generate good questions. Does a lot of narrative clinical information adversely affect team decision making? When does the expert benefit the most from having a mechanical anchor to start from in the clinical synthesis category? However, like many taxonomies it tends to suggest clean distinctions where the differences are often blurry. For example, the degree to which the data are gathered in a structured manner falls on a continuum. Impressionistic and structured clinical methods are but rough demarcations on this continuum. It is my hope that it is a solid starting place.

CONCLUSION

Our traditional validation models oversimplify reality in dangerous ways that can lead to erroneous applied conclusions. We can actually be doing harm while believing that all is well. Adopting a framework where we examine who actually applies and gets hired combined with attention to what information decision makers chose and how they chose to use it will put us in a better place while providing important theoretical contributions. To do this we will need to collect information about who is hired or not hired and consider the application pool and potential applicant population. The average performance of the hired group can be far more illuminating than a correlation. We will also need to be mindful of all of the information that is available to decision makers in the environment. When this is done, the results of a Lens Model analysis framed within a decision-making taxonomy can give us far more information about the nature and quality of the decisions than we normally obtain. The opportunities to conduct interesting research and better train, inform, and equip decision makers appear vast.

Notes

- 1 The author gratefully acknowledges comments made on an earlier version of this chapter by Scott Highhouse and Paul Sackett. Of course the fault for any errors, omissions, oversights, and oversights remains with the author.
- 2 This section is adapted from Kuncel, N. R. (1999). *Maximizing validity and utility with multiple predictors*. Unpublished thesis. Minneapolis, MN: University of Minnesota.

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Recruitment, Job Search and Job Choice: An Integrated Literature Review

Xian Li and Zhaoli Song

INTRODUCTION

Recruitment has been viewed as a process in which organizations attract and hire qualified applicants (Dineen & Soltis, 2010). It includes all types of organizational practices that influence the number and quality of individuals that apply for vacant positions (e.g., Barber, 1998; Chapman, Uggerslev, Carroll, Piasentin, & Jones, 2005; Rynes, 1991). Breugh (2008) noted that important recruitment objectives include attracting qualified applicants and processing applicants quickly in order to fill positions with qualified workers, as well as gaining high levels of job performance and retention of new hires.

While an extensive amount of research examining recruitment processes has taken an organizational perspective (e.g., Barber, 1998; Chapman et al., 2005), it is critical to note that job applicants' or job seekers' intentions and behaviors are also important (e.g., Jaidi, Van Hooft, & Arends, 2011; Schreurs, Deros, Van Hooft, Proost, & De Witte, 2009), which are generally covered by the job search literature. Job search process involves various activities with the ultimate goal of obtaining employment (Boswell, Zimmerman, & Swider, 2012). It has been considered as a dynamic, self-regulated process in which job seekers attempt to regulate their motivation and emotions while they

are searching for suitable employment (Boswell et al., 2012; Kanfer, Wanberg, & Kantrowitz, 2001; Wanberg, Zhu, & Van Hooft, 2010). The key outcomes examined by job search researchers include job search behaviors and the employment outcomes such as the number of job offers received, the duration of job search, as well as employment quality indicators such as employee attitudes (Saks & Ashforth, 1999). Job search behavior is typically operationalized by measuring the intensity / frequency with which job seekers engage in job-search activities, such as revising résumés, completing applications, or by measuring overall effort (Blau, 1994; Boswell et al., 2012; Saks & Ashforth, 1999).

Above, the reviews suggest that job recruitment and job search are highly relevant phenomena. On one side, recruitment is an essential human resource practice for organizations looking to attract and select suitable applicants/job seekers. On the other side, job seekers search for the best possible job and can be attracted to apply for jobs at specific organizations. Given their distinctive focuses, the practical question driving recruitment research is how to attract more qualified individuals into the applicant pool, whereas the practical question driving job search research is how job seekers obtain quality employment. Moreover, recruitment sources are defined as the sources used by employers to

find qualified applicants, and are frequently categorized as internal (i.e., employee referral) and external sources (i.e., direct applications). In contrast, job search research defined the sources used by applicants to find jobs as formal (e.g., public employment agencies) and informal (e.g., friends or relatives; Barber, Hollenbeck, Tower, & Phillips, 1994). Despite these differences, we believe it is useful to integrate these two literatures in an attempt to stimulate further research.

There have been some attempts to integrate these two lines of research. For example, da Motta Veiga and Turban (in press) reviewed both recruitment and job search literature and suggested that they can be integrated along frameworks such as signaling, expectancy, and the theory of planned behavior. Carlson and Connerley (2003) also proposed a staffing cycle framework that takes both job seekers' decision and organization's decision into staffing consideration and organized them in a sequential order.

In this chapter, we conduct an integrated review of the recruitment and job search literature. Our review is built on, but distinctive from, past similar efforts (Schwab, Rynes, & Aldag, 1987; Carlson & Connerley, 2003; da Motta Veiga & Turban, in press). It is characterized by two significant features: First, we break down the recruitment process and the job search process into steps and match steps of the two processes in their natural sequences. Most job search theories have not focused on the search process, which might be due to the fact that most participants were recruited after job alternatives have been identified (Schwab et al., 1987). However, studying job search as a process can be beneficial. For example, research found that job seekers might change their job search approach during the process (e.g., Barber et al., 1994). They may change their job search behaviors over time because they have moved to a different stage of the search process, learned how to master the process, or because of emotional responses during the search process.

In addition, research that examines the recruitment practices and the job search behaviors at different stages can help us better understand how each step takes place and how they contribute to the overall outcomes of recruitment and job search. Bangarter, Roulin, and Konig (2012) argued that job seekers and recruiting organizations develop adaptive relationships at different stages of the job search and recruiting process. Repeated adaptations and counter-adaptations between job seekers and recruiting organizations will result in equilibrium or escalation. In a recent meta-analytical study, Uggerslev, Fassina, and Kraichy (2012) examined recruiting predictors on applicant attraction across multiple recruitment stages. They found that

characteristics of the job, organization, and recruitment process, recruiter behaviors, perceived fit, and hiring expectancies influenced applicant attraction in different ways at different stages.

Second, we focus our analysis on the interactions and mutual influences between recruiting organizations and job seekers. We argue that a firm's recruitment processes not only influence an applicant's attraction to that firm but also may influence the applicant's job search processes. Similarly, we also expect that how an applicant searches for a job will influence how a potential employer is perceived during the job search process. The selection literature has acknowledged that applicants' reactions to procedures are an important aspect of the selection process (Gilliland, 1994; Hülsheger & Anderson, 2009; Rynes, 1993). The job search literature also confirmed that reactions to selection may influence applicants' job choice, and perceived organization reputation (Kanar, Collins, & Bell, 2010; Loda & Coleman, 2005). Therefore, we believe that a dual-process framework of recruitment and job search can enhance our understanding of both recruitment and job search phenomena.

A DUAL-PROCESS VIEW OF RECRUITMENT AND JOB SEARCH

Both recruitment and job search literatures have suggested different phases of the recruitment and job search processes. Barber (1998) noted that the recruitment process includes three phases: generating applicants, maintaining applicant status, and influencing job choice. In the generating applicants phase, organizations are attempting to attract quality applicants to apply for positions. During the maintaining applicant status phase, organizations are attempting to keep applicants interested in the firm when they are exposed to the organization's selection procedures (i.e., interviews, site visits). When an employment decision is made, the organization will attempt to influence job choice such that good applicants will accept the job offer. Job search behaviors, on the other hand, can also be understood as a series of actions in sequential phrases. For example, job search behavior has been categorized as preparatory and active (Blau, 1994; Saks, 2006; Saks & Ashforth, 1999; Wanberg, 2012). Preparatory search involves gathering information, revising résumés, and reading job-search publications. Active search means publicizing availability for work and actually applying for open positions. Active search

usually follows preparatory search behaviors. Kidwell, Grosser, Dineen, and Borgatti (2013) developed a multistage job search model based on theory of self-regulation, social comparison theory, control theory, and the attentional focus model. The model proposed how various intrapersonal (i.e., job search effort, job search progress) and sociocontextual (i.e., job search effort by peers in a social network) factors are associated with job seekers' self-regulation of effort at different job search stages (i.e., preparatory, active-extensive, and active-intensive).

Integrating process models in both the recruitment and job search literatures, we propose that there are four parallel and matched phases of recruitment and job search. First, in a typical recruitment process, hiring organizations will first post recruitment advertisements through different channels to disseminate information regarding the job openings. The extent to which organizations can effectively use these channels, as well as the public images of the company, will largely influence the number and quality of applicants that can be attracted. In parallel, in a typical job search process, job seekers will start their search with gathering vacancy information and choose organizations that meet their expectations to apply to. It can be theorized that individuals who gather more vacancy information will have more jobs to apply to and have a higher chance of getting a job. Second, it is common practice for hiring organizations to use tests to preliminarily screen candidates. Such tests include written tests, biodata, personality tests and many more. Third, a job interview is usually arranged if the applicant survives these tests. The job interview provides an opportunity for the employer and job candidate to meet in person and find out more about each other. A job applicant's interview performance will largely determine whether they can obtain a job offer while the practices of the hiring organization will influence the company's attractiveness to job applicants and therefore influence their decisions to accept an offer. Finally, hiring decisions and job

choice are made as a result of previous interactions. Thus, we organize our review according to the following four steps: recruitment advertising and information gathering and application, tests, job interview, and job choices. As mentioned previously, the discussion will focus on the interactions between hiring organizations and job seekers, in particular, how do the practices or behaviors of one party impact on the other party (Figure 17.1).

RECRUITMENT ADVERTISING VS. INFORMATION GATHERING

Firms create recruitment advertisements, web-sites, and train recruiters in an attempt to attract qualified applicants to apply for the organization. As the first contact between the hiring organization and job seeker, the content of the recruiting advertisement and the channel through which the message is delivered can substantially influence job seekers' perception of the company and the position that is offered. From an organizational perspective, understanding information sources and how recruiting practices affect job pursuit activities of potential applicants is important (Carlson, Connerley, & Mecham, 2002; Van Hove & Lievens, 2009).

Advertisement Channels

The primary objective of recruiting advertisements is attracting the attention of quality applicants. In most cases, recruiting advertisements influence the first impression of potential employment for an applicant (Barber, 1998; Orlitzky, 2007). Recruiting advertisements serve as an organization's self-presentation and primary source of information for job vacancies (Rafaeli &

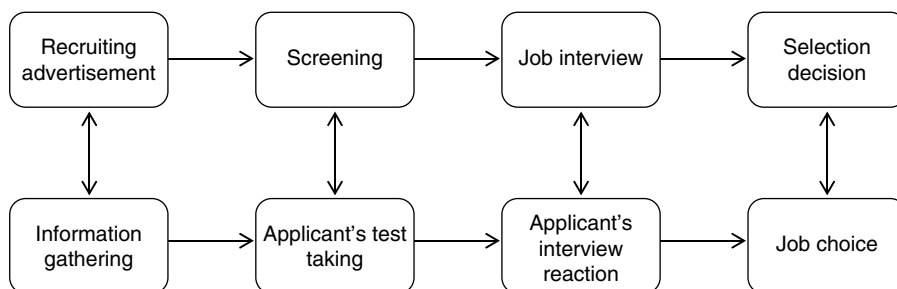


Figure 17.1 Dual-process model of recruitment and job search

Oliver, 1998). Recruiting advertisements affect job seekers' perceptions of recruiting companies and influence the motivation of their job pursuits.

Recruiting organizations will release employment information by posting advertisements in public media such as newspapers, carrying out campus recruitment talks, advertising in professional meetings and workshops, and collaborating with job search agencies. Sources by which potential applicants receive this employment information will serve as primary influences on their initial attitude toward hiring companies (Rynes & Cable, 2003; Swaroff, Barclay, & Bass, 1985; Zottoli & Wanous, 2000). In fact, imperfect information about the availability and specific characteristics of job alternatives leaves room for employers to influence job seekers' decisions (Taylor & Schmidt, 1983). For example, employers can influence job seekers' knowledge of job alternatives through their decisions about where to publicize position vacancies. The choices organizations make in this regard influence the number and types of applicants who become aware of employment opportunities (Schwab, 1982; Boudreau & Rynes, 1985). Many companies attempt to establish a presence on campus in order to increase their recruitment effectiveness (Breaugh, 1992). Herriot and Rothwell (1981) explicitly examined the recruitment sources and job seekers' initial decisions and concluded that recruitment brochures did enhance applicants' intentions to apply to organizations. From a policy perspective, a finding showing that individuals' differential success in securing employment is due to the different types of information they possess would be useful.

Advertisement Content

Research dealing with recruitment advertisements content has revealed their influences (Feldman, Bearden, & Hardesty, 2006; Highhouse, Beadle, Gallo, & Miller, 1998; Mason & Belt, 1986). For example, Lievens and Highhouse (2003) suggested that image-oriented advertising techniques that emphasize a company's innovativeness, prestige, and sincerity can enhance recruitment effectiveness. Highhouse et al. (1998) revealed that job applicants can infer certain employment information, such as salary ranges, from recruitment advertisements. Roberson, Collins, and Oreg (2005) indicated that the increased specificity in recruitment messages enhances applicant perceptions of organizational attributes and therefore increases their pursuit intention. Other studies on recruiting sources and message expression have

shown that realistic and job-specific information generally provides positive effects on job seeking and job choice. Recruiting advertisements with realistic and specific claims are more likely to create positive first impressions (Buckley, Fedor, Veres, Wiese, & Carraher, 1998), arouse positive attitudes toward job openings and recruiting companies (Taylor, 1994), and reduce applicant misperception (Belt & Paolillo, 1982; Mason & Belt, 1986; Werbel & Landau, 1996).

Publicity

Besides recruitment advertisements, research has recognized publicity as an efficient and credible means of marketing communication, exerting substantial influence on perceived credibility (Loda & Coleman, 2005). The value of publicity is tied to how successfully it disseminates information about a company across various types of media, including broadcasting, printing, and Internet. Information sources outside of organizations' direct control such as media press or word of mouth can impact job seekers' attitudes, beliefs, and expectations (Gatewood, Gowan, & Lautenschlager, 1993). Recruitment research notes that publicity is information in the early stage of hiring and job seekers use this information as signals of unknown company attributes (Kanar et al., 2010). Collins and Stevens (2002) found that due to the lack of work experience and public access to information about the recruiting companies, potential job seekers infer employment conditions by relying on publicity. Companies that have high brand recognition generally attract more applicants (Van Hove & Lievens, 2009). Collins and Stevens (2002) also found a positive relationship between publicity and organizational attractiveness. In addition, research found that people place more weight on negative than positive information, in forming an overall evaluation of a target (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Maheswaran & Meyers-Levy, 1990; Skowronski & Carlston, 1987, 1989). Kanar et al. (2010) noted that job seekers interpret positive and negative information differently and that negative information has greater influence on job seekers' organizational attraction and recall. Van Hove and Lievens (2009) also reported that negative publicity exerted a destructive effect on organizational attractiveness, while positive publicity had a positive influence on applicant decision making.

In addition, research has investigated the impacts of publicity and recruiting advertisement sequence on job seekers' perceived search

attraction to organizations as well as their job decisions. For example, Lee, Hwang, and Yeh (2013) found that negative publicity has greater effect on applicant attraction than the positive publicity and the perceived truthfulness of sequential intervening recruiting advertisements influences applicants' reactions, and further impacts on organizational attractiveness and job pursuit intention. When the publicity is negative, higher specificity of recruiting advertisements has more significant mitigation effects than lower specificity.

Signaling Effect

Another important line of research that contributes to our understanding of the recruitment advertising process is signaling effect. Signaling theory proposes that in the situation of information asymmetry in which individuals need to make decisions, individuals will interpret available information as it provides signals about what is unknown (Spence, 1973). Signaling theory has been utilized by recruitment scholars who note that because applicants do not have complete information about what it would be like to be an employee of an organization, they interpret available information as a signal about the job and working conditions in the organization (Bangerter et al, 2012; Cable & Turban, 2001; Collins, 2007; Rynes, 1991; Turban, 2001; Turban & Cable, 2003). As such, a job seeker's intention to apply for a position is directly influenced by the signals contained in the recruitment advertisement. For example, if applicants perceive firms as more selective, they might be more willing to apply and invest more time and energy to obtain employment with such firms. Similarly, company reputation can also be sent as a signal that influences applicant attitudes and behaviors toward the firm (Cable & Graham, 2000; Cable & Turban, 2001; Collins, 2007; Collins & Stevens, 2002; Turban & Cable, 2003). Despite its importance, organizations may not be aware of how applicants are interpreting information; thus, organizations might be sending the wrong signal to potential applicants. While the recruitment literature has focused predominantly on signals sent by organizations, the job search literature has paid little attention to examining whether and how signals sent by organizations influence job search behaviors and outcomes.

Applicants, on the other side, can also send signals to recruiting organizations in intentional or unintentional manners. For example, some evidence suggests that the applicant's handshake influences interviewer ratings of the applicant (Stewart, Dustin, Barrick, & Darnold, 2008). A good handshake,

which is measured by grip, strength, duration, vigor, and eye contact, provides a signal about the applicant's interpersonal skills. Job applicants' positive emotions are also found to be positively related to the chance of a second interview and the job offer (Turban, Stevens, & Lee, 2009). Evidence indicates that applicants tend to manage the impressions that they leave with organizational representatives in an attempt to obtain a job offer (Barrick, Shaffer, & DeGrassi, 2009). For example, nonverbal behaviors during the interview may be used by the interviewer to infer the applicant's credibility. Thus, one may consider self-presentation skills during the job search process as an attempt by the applicant to intentionally manage the signals that are communicated to potential employers (Barrick et al., 2009).

Information Gathering

From a job seeker's perspective, the first task that job seekers confront is to find sources of information about job openings. Job seekers may access job vacancy information from various types of information sources, including public employment offices or job search centers, directly approaching employers, and seeking help from relatives, friends, or former coworkers (Horvath, 2014). Based on the types of search channels and information sources, the literature has categorized job search as formal or informal. Results are consistent cross-studies: job seekers generally use and obtain employment through informal sources (e.g., friends and acquaintances referrals), rather than formal labor market intermediaries (e.g., employment services; Schwab, 1982; Schwab et al., 1987). In addition, unlike company-provided information sources such as recruiting advertisements, however, sources do not always act in organizations' best interests and might extensively influence applicants' initial attraction to an organization (Rynes & Cable, 2003).

Informal job searches usually involve mining job seekers' social networks (Franzen & Hangartner, 2006; Korpi, 2001; Wanberg, Kanfer, & Banas, 2000). Job seekers' social networks offer information about available job openings, can alert organizations that the job seeker is available, or may even exert actual influence over hiring decisions (Lin, 2001). Wanberg et al. (2000) reported that 36.3% of job seekers in a Midwestern state in the US found a job through friends, family, or previous coworkers, compared to job seekers who found jobs through advertisements (30.8%), employment agencies (11.5%), job fairs (3.3%), the Internet (2.2%), and others (16.5%). Burnett (1994) compared formal and informal job search

with a sample of the unemployed and found that only a few seekers found jobs through job centers. Gottfredson and Swatko (1979) found that even among PhD applicants, informal methods dominated the source used to obtain employment. Workforce referrals provide cost-efficient and reliable screening, which is also beneficial to hiring organizations (Fernandez, Castilla, & Moore, 2000).

Job Search Expectancy

When information about job openings is collected, job seekers will make decisions on which company to apply to. During the process, job seekers' expectations on the search outcomes can substantially influence their motivations and intentions to apply for a certain position. Expectancy theory proposes that individuals will choose actions they expect are most likely to lead to valued outcomes. As noted by Rynes (1991), firms engage in various recruitment activities in an attempt to enhance the perceived valence of a job with the firm. Job seekers who believe that they have a higher likelihood of obtaining a job offer are more likely to file an application. However, empirical findings are inconsistent across the literature. Meta-analytic results indicated that hiring expectancies were related positively to job pursuit intentions, acceptance intentions, and job choice (Chapman et al., 2005). Turban & Dougherty (1992) found that applicants were more attracted to the firm as an employer when they indicated an interest in them as candidates. This result suggests that applicants are indeed more attracted to and more likely to pursue employment with firms that they expect are more likely to hire them and are less likely to pursue employment with firms when they expect the firm is not likely to hire them. However, Feather and O'Brien (1987) found that subjects with greater hiring expectancies submitted fewer job applications, which may be because those individuals will reduce effort if they perceive they are making good progress toward the goal (Carver & Scheier, 1981, 1982).

To summarize, both recruitment and job search literature have realized the important influence of recruiting advertisements/information on job openings as well as the channels and sources through which this information is released. Therefore, we see opportunities for further integration of these two lines of literature. For example, while job search studies investigate informal job search, recruitment studies can examine the effectiveness of employee referral. We can also examine how signals that are sent intentionally by recruiting firms influence job seekers' job search expectancies and thus their intentions to apply. In addition, studies

that examine organizations' and job seekers' perceptions simultaneously will reveal more information on how employment information flows from the recruiting organization to potential applicants.

SCREENING

Employment Test

Employment tests that are perceived as more job relevant, less personally intrusive, fair, and allowing the opportunity to meet in person with selectors, are rated more favorably by job seekers. In terms of the test format, job seekers respond moderately well to cognitive tests (Silvester & Brown, 1993; Steiner & Gilliland, 1996), and tend to rate tests with concrete items as more job related than abstract tests (Rynes & Connerley, 1993; Smither, Reilly, Millsap, Pearlman, & Stoffey, 1993). Schmit and Ryan (1997) found that the requirement to take tests did not affect applicant decisions to withdraw from the selection process for police officers in the US. Thorsteinson and Ryan (1997) also found that the selection ratio of tests did not affect applicants' perceptions of fairness. In a telephone survey involving 546 participants, Lounsbury, Borrow, and Jensen (1989) found that positive attitudes were associated with employment testing when participants were told how the test was related to job performance and when feedback on test performance was provided. Tests are not however, viewed as favorably as assessment centers, the latter of which are perceived as being more job relevant by applicants (Macan, Avedon, Paese, & Smith, 1994). For the same reason, applicants also rate work sample tests positively, perceiving them as fair, valid, and job related (e.g., Dulewicz, Fletcher, & Wood, 1983; Iles & Robertson, 1997; Macan et al., 1994; Smither et al., 1993; Steiner & Gilliland, 1996). In addition, positive reactions to computer-based testing have also been reported in the literature (Arvey, Strickland, Drauden, & Martin, 1990; Schmidt, Urry, & Gugel, 1978). Schmidt et al. (1978) found that examinees preferred computer adaptive testing since it was fast, required them to answer fewer questions, provided immediate feedback, and faster notification of their chances of obtaining a job.

For biodata, a number of studies have reported that applicants react negatively to the use of biodata for selection purposes as they doubt its accuracy and usefulness (Robertson, Iles, Gratton, & Sharpley, 1991; Smither et al., 1993; Stone & Jones, 1997). For example, Stone and Jones (1997) conducted an experimental study whereby 86 participants were asked to play the role of job applicants and complete a biographical

information questionnaire. Half of the participants were told that the purpose of the questionnaire was as part of a selection decision-making process, the other half were told that the questionnaire was for simple career tracking purposes. Results indicated that perceptions regarding the fairness of biodata items were significantly lower when the data were collected for selection purposes.

In comparison to the extensive research on applicants' reactions to ability tests, fewer studies have examined the reactions to other types of test such as attitude test, personality test, or physical ability test. There are inconsistent findings on the extent to which the provision of an explanation regarding the use of a personality test can influence applicants' reactions to the procedure (cf., Harland, Rauzi, & Biasotto, 1995). Two studies (Ryan, Greguras, & Polyhart, 1996; Kravitz, Stinson, & Chavez, 1996) examining physical ability testing reported the job relevance of these tests to be an important determinant of applicants' positive reactions.

In a most recent meta-analysis, Anderson, Salgado, and Hülsheger (2010) comprehensively summarized applicant reactions to 10 popular methods of employee selection. Results showed that there is considerable similarity in applicant reaction toward specific selection methods. In particular, work samples and interviews are most preferred; résumés, cognitive tests, references, biodata, personality inventories are favorably evaluated; and honesty tests, personal contacts, graphology are considered as the least preferred selection methods. The findings can also be generalized across countries.

To summarize, although screening and employment tests are critical components of the job search process, job search literature paid very little attention to this issue. Currently, most of the evidence of applicants' reaction toward screening and tests was found in the recruitment literature. A job seeker has to survive from this stage to gain an interview opportunity. In this sense, it should be at least in equal importance to job interviews and deserves similar levels of scholarly attention. In particular, job search studies can directly examine job seekers' test-taking experiences as well as how these experiences influence their job search motivation, job search effort, and final employment outcomes.

JOB INTERVIEW

Interviewer Behaviors

Research on job interviews focused on the impact of the personal qualities and behavior of the interviewer on various outcome variables, such as job

offer expectancy, perceived probability of receiving and accepting an offer, and overall impression of the company. Early research supported the impact of personal qualities such as warmth, sincerity, empathy, and good listening skills on the perceptions and intentions of interviewees (e.g., Harris & Fink, 1987; Rynes, 1991; Rynes, Heneman, & Schwab, 1980). In terms of interviewer behavior, question style, question invasiveness, interviewer job knowledge and informativeness were found to influence applicants' general reactions to interviews (e.g., Harris & Fink, 1987; Powell, 1991; Rynes & Miller, 1983).

Evidence indicates that recruiter behaviors are related to job and organizational characteristics and to applicant attraction to the firm (Chapman et al., 2005; Harris & Fink, 1987; Taylor & Bergmann, 1987). When recruiters are seen as more personable, competent, and informative, applicants tend to have more attraction to the firm and are more likely to apply for the job (Chapman et al., 2005; Dougherty, Turban, & Callender, 1994; Harris & Fink, 1987; Kenny, Kashy, & Cook, 2006; Turban & Dougherty, 1992).

In addition, recruiter behaviors can also provide applicants with insight on what it would be like to be an employee in the firm (Breaugh, 1992; Rynes, 1991; Rynes, Bretz, & Gerhart, 1991; Turban, 2001). For example, an unfriendly recruiter may signal an unfriendly work environment and a warm and personable recruiter is more likely to indicate a warm working environment (Goltz & Giannantonio, 1995; Rynes et al., 1980; Taylor & Bergmann, 1987; Wanberg, Basbug, Van Hooft, & Samtani, 2012). In a recent meta-analysis, Chapman et al. (2005) found that recruiter behaviors influenced applicant attraction through perceived job and organizational characteristics.

Interviewee Behavior

On the job seeker's side, a large body of research has explored applicants' reactions to the interview (e.g., Chan & Schmitt, 2004; Collins, 2007; Harris & Fink, 1987; Powell, 1991; Rynes, 1991; Rynes et al., 1980; Stevens, 1998; Taylor & Bergmann, 1987). Positive candidate reactions have been reported to particular interview formats and modes of delivery, for example, patterned behavior description interviews (Janz & Mooney, 1993) and video conference interviews (Kroeck & Magnusen, 1997). Conversely, candidates have been found to react less positively to telephone-based and face-to-face interviews (Silvester, Anderson, Haddleton, Cunningham-Snell, & Gibb, 1999).

Interviewers' pre-interview impressions influence how applicants behave, and perform, during

the interview, which could influence applicants' subsequent employment outcomes (Macan & Dipboye, 1990). Dipboye (1982, 1992) suggested that applicants may respond in a manner consistent with interviewers' initial expectations and thereby fulfill the prophecy. Dougherty et al. (1994) used coders who listened to the actual audiotaped selection interviews to rate how well applicants communicated their strengths to the interviewer and their rapport with the interviewer. He found that interviewers' pre-interview ratings of applicants were positively related to final ratings. Additional analyses indicated that the applicant's interviewer behaviors (i.e., communication style and rapport) were related to the interviewer's behaviors of positive regard during the interview.

While interviewers' pre-interview impressions influence job seekers' behavior in the interview, job seekers' own pre-interview experiences may also influence interview outcomes. For example, evidence suggests that applicants are more attracted to firms when they have greater hiring expectancies (Chapman et al., 2005). If applicants engage in more company research for firms with greater hiring expectancies, then the applicants may be able to perform better during the interview, resulting in more positive employment outcomes. In another example, Bell and colleagues (Bell, Ryan, & Wiechmann, 2004; Bell, Wiechmann, & Ryan, 2006) found that applicants' justice expectations are positively related to their justice perceptions after the job interview, as well as outcomes like test-taking efficacy and motivation and their intentions to accept and recommend the job.

Fairness

Organizational justice is an important research area that investigates applicants' reactions toward the interview process. Gilliland (1993) presented a number of distributive and procedural rules that may account for candidates' perceptions of selection fairness. Selection research showed that selection justice has an impact on various outcome measures, such as intention to recommend the organization to others (e.g., Bies & Shapiro, 1988; Gilliland, 1994; Ployhart & Ryan, 1997), (for detailed discussion, please see Chapter 18, this *Handbook*).

To summarize, recruitment research generally failed in finding evidence to justify the reliability and validity of job interviews. However, it does not stop job interviews from being a popular selection tool as it indeed provides an opportunity for recruiters and applicants to meet in person and find out more about each other. In comparison, recruitment research investigating training

and recruiter behavior has yielded fruitful results, especially those investigating how recruiter behaviors influence an applicant's interview performance and experience. Job search literature, on the other hand, has focused extensively on applicants' interview experiences, chiefly, their perceptions on organizational justice. Research that investigates how applicants react to different types of recruitment practices is particularly useful for both scholars and employment practitioners.

JOB CHOICE

Job choice refers to whether a qualified applicant accepts the job offer from the organization (Barber, 1998; Chapman et al., 2005). Interestingly, although recruitment scholars are interested in job choice, only a few studies have directly measured job choice (Chapman et al., 2005). Instead, researchers usually measure proximal indicators of job choice. The most popular outcome variable is attraction to the firm as an employer, which is applicants' overall evaluation of potential employers (Chapman et al., 2005). Other outcome variables include job pursuit intention, which is conceptualized as an applicant's intention to pursue a job and continue in the applicant pool by attending an interview or site visit. Recruitment scholars have also examined acceptance intentions, which is the likelihood that an applicant would accept a job offer, as well as recommendation of the job to others (Barber, 1998; Chapman et al., 2005). Evidence showed that acceptance intentions tend to be correlated with job choice (e.g., Chapman et al., 2005; Turban, Campion, & Eyring, 1995), which provided support for its validity of being a proxy of job choice.

Person–Organization/Job Fit

Considerable evidence indicates that perceptions of person–job (P-J-FIT) and person–organization fit (P-O-FIT) influence applicants' attraction to a firm as well as their job choice decisions (Cable & Judge, 1996; Chapman et al., 2005; Judge & Cable, 1997). P-O/P-J fit is defined as the compatibility between individuals and the organizations/jobs (Kristof, 1996). P-O/P-J fit theory posits that there are characteristics of organizations and jobs that are congruent with the characteristics of individuals, and that individuals' attitudes and behaviors will be influenced by the degree of congruence between individuals and organizations or the job

(Pervin, 1989). Bowen, Ledford, and Nathan (1991) demonstrated P-O fit as a suitable outcome of the hiring process by showing that P-O fit becomes the critical factor when selecting employees for long-term employment and organizational flexibility. Selecting people whose personalities are compatible with the organizational culture creates a flexible workforce with employees who can move easily between positions.

Personality variables have been found to predict peoples' preferences for organizations with certain types of reward systems. For example, college students with a high need for achievement prefer hypothetical organizations characterized by encouragement and reward of competitive individual effort and accomplishment (Bretz, Ash, & Dreher, 1989; Turban & Keon, 1993). Materialism and self-efficacy have significantly predicted individuals' preferences for organizations with pay systems involving characteristics such as high pay levels and individual-based pay (Cable & Judge, 1994). Corresponding results have also been found for self-esteem and preferences for organizational centralization (Turban & Keon, 1993). These results indicate that personality traits and organizational characteristics may significantly influence applicants' job choice decisions.

Job seekers prefer organizations where their personal characteristics are aligned with organizational attributes (Cable & Judge, 1994; Chatman, 1989, 1991; Judge & Bretz, 1992). Attributes that are being taken into consideration include: value, which refers to the enduring beliefs that guide individuals' attitudes and behaviors (Chatman, 1989, 1991); demographic similarity, which includes gender, age, race, socio-economic status and so on. Individuals who are demographically similar to other organizational members appear to enjoy benefits more than those who are less similar (Pfeffer, 1983). The specific influences on fit evaluations from the organizations include the general reputation, attitude toward product/industry, status of particular functional areas within the firm, training and promotion opportunities, and geographic location. Job applicants form evaluations of fit with companies based on interactions with both formal organizational representatives (i.e., interviewers) and informal contacts in the firm (Rynes et al., 1991).

More recently, Saks and Ashforth (2002) found job search behavior and career planning were positively related to pre-entry P-J and P-O fit. Dineen, Ash, and Noe (2002) found that P-O fit is associated with applicant attraction in the context of Web-based recruitment. In a longitudinal field study, Carless (2005) examined the relationship between perceived P-J and P-O fit

and organizational attraction, intentions to accept a job offer, and actual job offer decisions. Data were collected prior to the selection process, during the selection process, at the end of the selection process, and after job acceptance decision. The findings showed that perceptions of P-J and P-O fit influenced attraction at different stages of the selection process. In a recent meta-analytical study, Kristof-Brown, Zimmerman, and Johnson (2005) examined the relationships between person-job, person-organization, person-group, and person-supervisor fit with pre-entry (applicant attraction, job acceptance, intent to hire, job offer) and post-entry variables (attitudes, performance, withdrawal behaviors, strain, tenure). In another meta-analysis study, Uggerslev et al. (2012) found that perceived fit was a strong predictor of applicant attraction but less predictive of job choice. Job characteristics, in comparison, accounted for the greatest variance in job choice decisions.

Organizational Characteristics and Recruitment Practices

Besides the P-O/P-J fit paradigm, literature has also documented a large number of studies that examined the influence of organizational characteristics on job seekers' job choice decisions (Turban, Forret, & Hendrickson, 1998). In a recent meta-analytical study, Chapman et al. (2005) found that the recruitment outcomes of job pursuit intentions, job and organization attraction, acceptance intentions, and job choice were predicted by organizational and job characteristics, applicant perceptions of the recruiting process, recruiter behaviors, and hiring expectancies.

Besides organizational characteristics, there are recruiting practices that can be used by companies to directly influence job seekers' decisions (Anderson, Born, & Cunningham-Snell, 2001; Glueck, 1973). For example, companies can influence job seekers' decisions through the timing of recruitment procedures, and the policies regarding job offer acceptances (Becker, Connolly, & Slaughter, 2010). Firstly, in markets where recruitment occurs in well-defined cycles such as college recruitment, companies have the option of being either early or late to enter the recruiting process. It is possible that organizations can enhance their chances of obtaining job acceptances through early entry into the recruiting cycle. Secondly, companies can also influence job seekers' choice through the manipulation of the amount of time they allow individuals to ponder an offer. In many cases, job seekers find themselves in the dilemma of having to accept or reject a minimally

acceptable alternative before receiving an offer from a preferred alternative.

An interesting issue concerns the effects of recruiting practices versus the effects of job and organizational characteristics on applicants' attraction to firms (Wanous & Colella, 1989), and whether recruiters influence attraction to firms beyond the effects of job information. Results are inconsistent across the literature. For example, Rynes and Miller (1983) found that recruiters influenced attraction only when recruiter information was presented, and when both job and recruiter information were presented, only job attributes influenced attraction to firms. Similarly, Powell (1984) tested a model in which recruiter behaviors and job attributes each have a direct influence on applicant attraction. He found that only job attributes influenced attraction; recruiter behaviors did not have a direct influence on attraction. This evidence suggests that recruiters do not have a direct effect on applicants' attraction to firms when job and organizational characteristics are considered, although the relative effect of recruiter behaviors and job and organizational attributes on attraction probably depends on the context (Wanous & Colella, 1989).

While some evidence indicates that recruiting practices do not influence attraction to firms when job and organizational characteristics are considered, other evidence suggests that recruiters do influence attraction beyond the effects of job attributes. For example, Rynes, Bretz, and Gerhart (1991) provided evidence that recruiters have a direct influence on applicant attraction. Harris and Fink (1987) and Powell (1991) also found that recruiter behaviors explained unique variance in applicant attraction to firms after job attributes were entered in the regression equation, suggesting a direct influence of recruiter behaviors on attraction. In addition, the elaboration likelihood model of persuasive communication (Petty & Cacioppo, 1986) argues that in anxiety-producing situations such as employment interviews (Powell, 1991), a person may be more influenced by salient environmental cues, such as the attractiveness of the source of the information (i.e., recruiter behaviors), than by the information per se (i.e., job and organization characteristics). This argument also suggests that recruiters will have a direct influence on attraction above the effects of job and organizational attributes.

Job Choice Decision Models

From the job seeker's perspective, theories about the process individuals employ to evaluate job

opportunities have been formulated in various disciplines such as economics, psychology, and the decision science. These models differ substantially in the assumption they make about the search and evaluation process. The first and probably most widely cited models of job choice assume simultaneous evaluation of multiple alternatives. Economists have traditionally assumed that individuals assess the overall utility of each job and then accept the one that promises the highest utility, all things considered. Models that assume simultaneous evaluation of multiple alternatives are based on the assumption that maximization of utility is the ultimate objective of job choice.

The second type of model is the sequential model which tends to assume satisficing criteria. According to this model, the job seeker's objective is to find a minimally acceptable, rather than an optimal job. Although job seekers may not have sufficient information to maximize their utility, they have the knowledge of their living expenses and aspirations and will therefore set their minimal levels to enable a particular standard of living.

Research investigating the decisions to accept versus to reject a job offer suggests that positive features of options are expected to loom larger in choosing, whereas negative features of options are expected to weigh more heavily in rejection (Shafir, 1993). For example, Rynes et al.'s (1991) study suggests that negative recruiting experiences may be more likely to influence job seekers than positive recruiting experiences. The number of participants forming negative impressions of fit on the basis of recruitment was nearly double the number forming positive impressions on this basis. The potential distinction between choosing versus rejection decisions in job choice, however, has received little scholarly attention.

Additionally, hiring expectancies also tend to be positively related to application attraction (Barber, 1998; Chapman et al., 2005; Rynes, 1991; Rynes & Lawler, 1983). Specifically, when job applicants expect to be offered a position by an organization, they are more likely to be attracted to the organization as an employer, and to accept an offer if they are to receive one (Harris & Fink, 1987; Powell, 1984; Rynes & Miller, 1983; Taylor & Bergmann, 1987).

Since employment decisions are often made after job interview, research has also examined the effect of job interview on applicants' job choice. Field and experimental studies have generally found that interviewer effects added little to the predicted variance on job choice intentions when perceived job attributes were controlled (e.g., Harris & Fink, 1987; Rynes & Miller, 1983; Taylor & Bergmann, 1987). Taylor and Bergmann (1987) found that recruitment activities were related to

applicants' intentions to accept offers and perceptions of organizational attractiveness at the initial interview phase, but at subsequent stages in the process job attributes were more predictive of these outcomes.

To summarize, both recruitment and job search research offered comprehensive discussion on job choice and have agreed that job choice decisions should be made based on the degree of fit. The two lines of literature are also taking both organizations' and job seekers' perspectives into consideration and thus providing complementary evidences. In particular, recruitment research showed how job seekers' background and values influence organizations' selection decisions; job search studies also examined how various recruitment practices and organizational characteristics influence job seekers' job choice. More recently, studies also began to examine the relationship between job choice and post-entry performance, long-term career development, which further enhanced our understanding on the consequences of the job choice decisions.

ONLINE JOB SEARCH AND RECRUITMENT

The employment market has experienced tremendous changes in the past decades. The advancement of IT technology has raised new challenges for recruitment and job search practices. To date, research has yet to fully address the implications of growth in the use of the Internet as a recruitment and job search medium (Bartram, 1999; Richards, 2011). Bartram (2000) argued that the Internet has already had a dramatic impact on the way in which recruitment and selection are carried out. The use of the Internet also enabled the widespread adoption of computer-based assessment and it is predicted that it will replace paper as the default medium before very long. Kuhn and Skuterud (2000) reported that a considerable amount of job seekers used the Internet to seek jobs and Internet search rates exceeded those of traditional methods such as the services of employment agencies, contacting friends or relatives, and using the registers of union or professional organizations. Kuhn and Mansour (2014) found that unemployed persons who look for jobs online are re-employed faster than those who do not search online.

Research showed that organizations can influence job seekers' perceptions through website design. Scheu, Ryan, and Nona (1999) conducted a study using 98 psychology students to investigate the effectiveness of 10 manufacturing

organizations' websites as recruiting mechanisms. They found that potential applicants' perceptions of the websites influenced their views of the organization, which in turn, influenced their intention to apply to that particular organization. Dineen et al. (2002) found that in the context of Web-based recruitment, person-organization (P-O) fit is associated with applicant attraction. In a recent study, Jack, Feild, Giles, Bernerth, and Short (2011) found that technologically advanced website features and depicting racially diverse organizational members are associated with job seekers' organizational image perceptions. These relationships are moderated by job seekers' familiarity with recruiting organizations such that effects were weaker for more familiar organizations.

Van Rooy, Alonso, and Fairchild (2003) designed a study to directly compare the number of jobs found as well as the perceptions toward job search tools when employing Internet-based tools versus traditional tools such as print media. They found that the number of jobs found were clearly greater in the Internet-based conditions than in the traditional search condition. Fountain (2005) suggested that when Internet use is uncommon, unemployed people who search online have an advantage in finding jobs. As the use of the Internet for job searching increases, the advantage for users over nonusers disappears.

Feldman and Klaas (2002) investigated the online job search experiences of managers and professionals. They found that facility with Internet navigation is related with the amount of general job searching, especially for those who explore job openings in private without fear of retribution from supervisors. They also found that managers and professionals are more likely to use the online job search when the geographical scope of the job hunt is wide, when a major salary increase is desired, and when both small and large firms are being considered as potential employers. For managers and professionals, online job search is perceived as less effective than personal networking, but much superior to traditional job search methods such as newspaper ads and 'cold calling'. Finally, they also identified several major issues that are closely related to the effectiveness of online recruiting such as the degree and speed of follow-up to online applications, lack of specific and relevant job descriptions on a company's website, concerns about the security of personal information, and difficulty in customizing, formatting, and downloading résumés to companies' specifications. Kuhn and Skuterud (2004) investigated the online job search experiences of the unemployed and found that people who use Internet job search do spend less time unemployed. However, this unemployment differential is eliminated and in some cases reversed.

Hogler, Henle, and Bemus (1998) proposed that employers solicit job applications and screen prospective employees through the Internet. Despite its convenience, the technology may have a disparate impact on certain groups of workers, particularly ethnic minorities. Bartram (2000) raised issues of security, confidentiality, authentication, control of assessment conditions, control over practice, and equality of access. He identified some potential areas of abuse of the system and calls for the development of international standards to protect the rights and interests of test providers, test users, and test takers.

An interesting mechanism that organizations may employ in their recruitment process is to interpret information that applicants 'publish' on social networking sites (SNS, e.g., LinkedIn, Facebook, and Twitter) as signals regarding the applicant's personality, ability, and potential fit with the organization. Applicants, on the other side, might also intentionally attempt to signal attributes through social networking sites. For example, students who have joined LinkedIn with the specific purpose of attempting to signal professionalism to potential employers. Nikolaou (2014) found that job seekers still use job boards more often than SNS. The associations between LinkedIn usage and its effectiveness, the time spent on SNS and LinkedIn effectiveness, are stronger for 'passive' candidates. HR professionals, on the other hand are more engaged in SNS and were considering LinkedIn as more effective than Facebook in the actual recruitment process. Roulin (2014) examined the relationship between the use of SNS in selection and job search, personality, SNS self-promotion and the likelihood of inappropriate content postings. Results showed that inappropriate content postings are less likely when participants are informed that a high proportion of employers use SNS as a selection tool. Participants' age, privacy settings, extraversion, and SNS self-promotion are also related to inappropriate content postings.

Most recently, mobile phones are increasingly used to access services offered on the Internet (Böhm, 2013). Time spent online has shifted considerably from computers to mobile devices. This development changes job seekers' expectations, perceptions, and behaviors when searching for jobs. Using a sample of job seekers in Germany, Böhm (2013) found that a large proportion of smart phone and tablet users have gathered job-related information and applied for job openings through these devices. Future studies that aim to enhance our understanding in new recruitment and job search channels such as mobile platforms, as well as the problems that are associated with these new methods will be helpful.

FUTURE DIRECTIONS

Recruitment and Job Search across Nations

As organizations increasingly recruit outside their national frontiers, greater insight is required into the reactions of candidates from different cultural backgrounds (Wanberg, Kammeyer-Mueller, & Shi, 2001). Globalization, greater recognition of human resources as a potential source of competitive advantage, and changing workforce demographics have made the attraction of the best available talent a top management concern. As a result, cross-nation recruitment and job search becomes a common practice nowadays. Nowadays, an Indian programmer might be looking for a position in Silicon Valley; Japanese firms also invite Westerners to sit on the board. Presently, research that tackles the issue of cross-nation recruitment and job search has been severely lacking. In particular, it is critical to understand what are the unique difficulties that companies face when they are recruiting from a foreign country, what are the top concerns for job seekers if he or she chooses to work outside his or her own country, and what role cultural differences play in the process.

Miller and Guo (2013) provided a comprehensive review of the studies that pertain to cross-cultural recruitment practices. They argued that cross-cultural recruitment is a consequence of natural ecological forces, organizational strategies, and multinational corporation practices to make the MNCs more adaptable to local environments. They also reviewed studies on cross-cultural values and their influence on job choice, employer branding, social networks, word of mouth recruitment, campus recruitment, as well as equal employment opportunity.

Event Episode as Unit of Analysis

Another potentially fruitful direction is to conceptualize and empirically examine recruitment and job search as behavioral episodes. Psychology has long promoted using episodes as the natural unit of conceptualization and for the analysis of behaviors. However, organizational scholars only recently seriously embraced this approach. In a seminal conceptual paper, Beal, Weiss, Barros, and MacDermid (2005) conceptualized job performance as behavioral episodes that are thematically organized around work-relevant immediate goals. In the work and family literature, Maertz and Boyar (2011) defined work-family conflict episodes as incidents or occurrences

of work–family conflict. The episodic approach provides a refined assessment of within-person/organization variability of the behavior.

As we theorized at the beginning, recruitment and job search are unfolding processes of sequential events: for each vacancy lead, hiring companies will post recruiting advertisements, individuals will look for job information, contact the employer, and submit the application, company and job seekers will go through job interviews to find out more about each other, and decide whether to offer, accept, or reject the offer. These search activities are behavioral episodes that have clear immediate goals and time boundaries (Kanfer et al., 2001). In the job search literature, however, although job search has been conceptualized as the unfolding process of a series of behavioral episodes, in terms of measurement, it usually concerns the intensity or effort of job-search activity over a specific time period. In the recruitment literature, there is also a limited number of research that views recruitment as a sequential process and examines its effectiveness at different recruitment stages. This type of lump sum record of intensity and effort tends to neglect unique properties of each recruitment and job-search activity and mask the sequence of behaviors in pursuing each job lead. To address this research gap, we need reports of daily recruitment and job-search events across several consecutive days, probably utilizing intensive data collection methods such as the diary method (Bolger, Davis, & Rafaeli, 2003) and the day-reconstruction method (DRM, Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004).

CONCLUSIONS

This chapter contributes to the literature by reviewing recruitment and job search studies from a process-based, interactive perspective, and therefore outlining a potentially promising area for future research. Researchers have long examined the various recruitment practices and the perceptions of applicants during their job search processes. We now have a much better understanding on how these two parties interact with each other on different stages. Practically, the current review highlights the need for mutual understanding from both job seekers and recruiting organizations, through which high chance of job search and recruitment success can be achieved. Such an interactive perspective can also help employment counselors, job-search agencies, and policy-makers to better design and implement

intervention programs to promote effective recruitment as well as job search. The perspective can also be applied in the process of understanding new phenomena such as online job search and recruitment across nations. In addition, we believe investigating the events in which job seekers and recruiters interact with each other along the process can offer new insights. Scholars should chew on the new findings, and embrace more innovative perspectives and methods that can help to reveal the interactive nature of recruitment–job search behavior.

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Applicant Perspectives on Employee Selection Systems

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INTRODUCTION

Historically, personnel selection has investigated how to select the right candidate for the job to benefit the functioning of the organization. The needs of the organization – in terms of the human capital needed to fill a particular job opening – were the primary focus, with the predictive validity of selection procedures being paramount. Although some mention was made regarding concepts like ‘face validity’, that is, the degree to which the selection process looks job-related to the applicant, the viewpoint of the applicant was rarely considered.

Over time, greater attention was placed on personnel selection from the perspective of job applicants. More specifically, researchers began to investigate how applicants perceive and react to the hiring process. The source of this interest varied to some degree depending on the national culture of the researcher. For instance, while the primary motive for interest in applicant reactions in the US stemmed from a desire to avoid litigation on the part of applicants, some European researchers (e.g., Schuler, 1993) focused on concepts like ‘social validity’, or ensuring applicant dignity and respect. Whatever the motivation, this research interest was accelerated by the development of theoretical and conceptual models to explain

applicant reactions (e.g., Arvey & Sackett, 1993; Gilliland, 1993; Schuler, 1993). Not only did these models aim to explain how applicant reactions develop, but the hope was that such reactions could also explain a number of outcomes, such as perceptions of the organization, later behavior on the job, and applicant litigation.

Over the past two decades, a rich literature on applicant reactions (and the related topic of test-taking predispositions such as applicant motivation) has developed. This literature has provided a number of consistent findings regarding which selection procedures applicants prefer. It has also shown that applicant reactions affect a number of applicant attitudes and perceptions that are within the selection arena. Although the original hope was that applicants’ treatment and perceptions during the hiring process would also affect more distal outcomes on the job, the effects of applicant reactions on more distal outcomes such as job performance have not been borne out in the research (McCarthy, Van Iddekinge, Lievens, Kung, Sinar, & Campion, 2013), and the effects on job attitudes and actual litigation remain largely unexplored.

Some researchers have thus discounted the ultimate value of applicant reactions research, but we think that this is too pessimistic, given that applicant reactions clearly do affect a number of important attitudes and behaviors. For example,

perceptions of the hiring process have a significant effect on organizational attractiveness; certain types of selection procedures (e.g., interviews) appear to be preferred over others (e.g., cognitive tests) by applicants around the world; and test-taking predispositions relate to test performance (e.g., Anderson & Witvliet, 2008; Anderson, Ahmed, & Costa, 2012; Anderson, Salgado, & Hülshager, 2010; McCarthy et al., 2013). Moreover, many issues still need to be examined, such as the way that selection may affect applicants' self-perceptions, and how reactions to promotional processes may affect job attitudes and performance.

In this chapter, we provide an overview of the applicant reactions literature, starting with an in-depth history of this area along with a description of the dominant conceptual and theoretical models. We next review the selection procedures that applicants tend to prefer, the outcomes that have been found to relate to applicant reactions, and the international and cross-cultural studies of applicant reactions. We next move to the antecedents of applicant reactions as well as factors that may moderate the effects of these reactions. We then review the growing field of test-taking predispositions. We conclude the chapter by reviewing the implications for organizations and applicants as well as the many unanswered questions to be addressed by future research.

RESEARCH HISTORY OF THE APPLICANT REACTIONS FIELD

From its inception, research on selection has predominantly been focused on the needs of the organization. Questions such as *'How can we select the best applicants?'* *'How can we make our tests more valid?'* *'How can we save time and money with our selection procedures?'* had dominated the literature. It was established that work samples and simulations are rated more favorably than other types of selection procedures (Chan & Schmitt, 2004). Starting in the 1990s, however, researchers began to adopt a more nuanced approach to examining applicants' points of view. At this point, the conversation was slowly expanded to include questions like *'How are applicants feeling about our selection procedures, and what do they like or dislike?'* *'Are the best applicants staying in our selection process?'* *'Do applicant reactions matter to recruitment outcomes?'* Early work illustrated that applicant reactions did matter to a number of outcomes. However, as mentioned previously, it wasn't until the development of models by Arvey and

Sackett (1993), Schmitt and Gilliland (1992), Gilliland (1993), and Schuler (1993) that research in this area became more theoretically rich and took large strides forward.

Subsequent work has primarily adopted Gilliland's (1993) fairness approach, perhaps because of its strong theoretical basis in organizational justice theory. Gilliland argued for the need to differentiate between procedural and distributive justice (e.g., a fair process versus fair selection decisions/whether a job offer was made), advanced the idea that different distribution rules might be used depending upon contextual issues, spearheaded the development of a list of procedural justice rules that map onto the selection context (e.g., job-relatedness of procedures; consistency of administration), highlighted the importance of interactional justice (e.g., treatment at the test site), and proposed that procedural justice might compensate for lower distributive outcomes.

Gilliland's (1993) model included 10 procedural justice rules under three categories. *Formal characteristics* included job relatedness, opportunity to perform, reconsideration opportunity, and consistency of administration. *Explanations* include feedback, selection information, and honesty. *Interpersonal Treatment* includes interpersonal effectiveness of the administrator, two-way communication, and propriety of questions. These 10 'rules' are defined as follows: (1) Job relatedness is defined as the degree to which the selection process is (or appears to be in the case of face valid job relatedness) relevant for the job the applicant is hoping to earn. (2) Opportunity to perform is defined as the ability to express one's true ability. (3) Reconsideration is defined as the chance to challenge or modify a decision made during the selection process. (4) Consistency is defined as the standardization of the process so that every applicant is treated in the same manner. (5) Feedback refers to the provision of timely and informative feedback about an applicant's performance on either their place in the process or a final decision being made about that selection hurdle or a job offer. (6) Selection information is defined as advanced information regarding the selection process they are going through with an organization. (7) Honesty is defined as truthfully communicating with applicants. (8) Interpersonal effectiveness is defined as the extent the test administrator treats applicants with warmth and respect. (9) Two-way communication is defined as the opportunity for applicants to have their opinions and views known during the selection process and/or to ask questions about the process. And finally, (10) propriety of questions is defined as the avoidance of questions which invade the privacy of an applicant. In addition, distributive justice refers to the perceived fairness of the

actual selection outcome, such as whether a positive outcome was perceived, or what type of outcome was received compared to others. Bauer, Truxillo, Sanchez, Craig, Ferrara, and Campion (2001) tested and validated a measure (the Selection Procedural Justice Scales or SPJS) of these 10 rules which supported Gilliland's justice model and outcomes and which has subsequently seen wide use. To further understand the development of this research area, we next turn our attention to the theoretical foundations of applicant reactions.

THEORETICAL FOUNDATIONS OF THE APPLICANT REACTIONS FIELD

To date, the applicant reactions field has been primarily driven by the theoretical foundation of organizational justice theory, as can be evidenced by its historical roots in Gilliland's (1993) justice-based model. Indeed, it is safe to say that a majority of the work we will review in this chapter is grounded in some form of organizational justice theory, and research in this area has begun to take a more sophisticated examination of relationships to examine boundary conditions, such as key interaction effects for applicant reactions. A recent example by Sumanth and Cable (2011) established that the status of an organization and applicant interact such that organizations with rigorous procedures allow them to select the best applicants but that the best applicants are more likely to find such procedures unjust than low-status applicants. In this section we describe some additional theoretical approaches beyond justice that have been used to explain applicant reactions.

Attribution

Ployhart and Ryan (1997) describe attributions as a fundamental part of social perception and are considered the basis for further judgments, emotions, and behaviors. Ployhart and Harold (2004) further argue that applicants make attributions about the selection procedures and outcomes they experience. This perspective is different from the theoretical basis of fairness. As they note, 'attributional processing occurs between the presence of an event ... and formation of perceptions (e.g., fairness, attitudes) and behaviour (e.g., motivation, test performance)' (p. 89). The theory argues that explanations given to applicants will vary on the richness of information they convey in terms of consistency, consensus, and distinctiveness as originally described in work by

Kelley (1967). This cognitive appraisal, which is based on understanding an applicant's attributional style, has the potential to expand the theoretical basis and domain of research in the applicant reactions arena. Although Ployhart and Ryan (1997) were able to establish initial support for the attribution framework, much more empirical work is needed to confirm this framework. We support the idea of additional work applying the attribution model as a way to expand our understanding of this framework.

Self-serving Bias

Yet another research stream is embedded in the concept of a self-serving bias, or social identity. This work is built upon empirical evidence suggesting that perceived test performance has an influence on applicant reactions (Chan & Schmitt, 2004). As a result, individuals may protect themselves from threatening situations, such as being rejected for a job or failing a test, by evaluating the test as unfair because, if the test is faulty, the outcome is not deemed as that important to worry about. Indeed, applicants may go to great lengths to protect their identities in a self-serving bias. As Herriot (2004) notes, 'It is argued that this theory [social identity theory] enables an understanding of how applicants' social identities interact with their perceptions of selection episodes to predict their exit from the process'. (p. 75). These findings also raise a potential paradox, as a fair procedure may result in positive attitudes about the organization, but may make the applicant feel even worse about themselves if they are unsuccessful in obtaining the job.

As these researchers note, studies which combine or examine the relative effects of a self-serving bias perspective with organizational justice are sorely needed, yet seldom done. A notable exception is a study conducted by Schmitt, Oswald, Kim, Gillespie, and Ramsay (2004) which found that both the self-serving bias and organizational justice appeared to matter in the perceptions of college freshmen taking the ACT and SAT. A provocative finding in this area is that following a negative selection decision where all applicants were told they had already scored in the top 20% of performers, those participants who were rejected and received performance feedback suffered lowered core self-evaluations versus those only being told they were rejected (Schinkel, van Dierendonck, & Anderson, 2004). This brings into question the advice about how much feedback to provide applicants with, as well as when to provide it.

In addition, new theoretical streams related to justice and self-concepts have begun which

examine *justice expectations*. Bell, Ryan, and Wiechmann (2004) theorize that expectations from direct experience, indirect experience, and other beliefs will influence attitudes, thoughts, and actual behaviors. More recently, a study by Bell, Wiechmann, and Ryan (2006) revealed that applicants with higher justice expectations reported higher levels of pre-test motivation and self-efficacy and more positive intentions to recommend and accept the job and positive justice perceptions in the testing process. Again, although this justice expectations approach seems promising, far more work is needed.

Justice Refinements: Fairness Heuristic Theory (FHT) and Fairness Theory

Beyond traditional organizational justice theory approaches, some refinements and new perspectives have been introduced. For instance, while still an organizational justice theory, work by Lind and others (e.g., Lind, 2001) focuses on fairness heuristic theory, which argues that individuals tend to use the information which they have readily available to them. More specifically, FHT argues that people normally perceive some risk in giving power to others and therefore seek to understand where they fit into the situation. In a selection situation this power is that of rejection or acceptance by a key entity, the organization. Given this, upon finding themselves in such a situation, individuals immediately begin to assess whether or not the entity is trustworthy, fair, and respectful (van den Bos, Vermunt, & Wilke, 1997), and, barring later events, this judgment that developed early in the relationship remains as the lens through which the applicant views the organization thereafter. Further, these judgments are most salient at the start of interactions because it is at that point when the least amount of information is known. In this way, an applicant's fairness perceptions develop as a type of sense-making about how the organization treats people and, by extension, will treat the applicant. Although FHT has only received scant attention in the applicant reactions literature, its focus on the development of the applicant's relationship with the employer seems a natural fit for the study of applicant reactions.

Another organizational justice approach is fairness theory, which describes how persons (in this case, applicants) react to negative outcomes (e.g., Folger & Cropanzano, 2001). Applicants can perceive that the employer *could* have done something different or *should* have done something

different; or that the employer *would* have done something different if such an alternative had been available. This fairness theory approach has been particularly useful in understanding how applicants process different types of explanations given to them when they receive a negative result from a selection procedure (e.g., Gilliland, Groth, Backer IV, Dew, Polly, & Langdon, 2001; Truxillo, Bodner, Bertolino, Bauer, & Yonce, 2009). Using this approach, explanations can be broken down into justifications (e.g., 'we used a good, valid procedure') versus excuses (e.g., 'we had no other choice but to do what we did because there were too many applicants for the number of jobs'). Although fairness theory shows promise for understanding a range of explanations that organizations give to employees (e.g., Shaw, Wild, & Colquitt, 2003), a meta-analysis of the effects of justifications versus excuses shows that the effects of these different types of explanations on applicant reactions are still unclear (Truxillo et al., 2009). However, this seems to be a promising area for future research.

WHICH SELECTION PROCEDURES DO APPLICANTS PREFER?

Numerous studies in many countries have examined which selection techniques job applicants prefer. Meta-analytic summaries of these studies reveal remarkable consistency across cultures, such that: interviews and work samples are judged the highest in fairness; résumés, cognitive ability tests, references, biodata, and personality tests are judged moderate in fairness; and honesty tests, personal contacts, and graphology are judged the lowest in fairness (Anderson et al., 2010; Hausknecht, Day, & Thomas, 2004). Table 18.1 presents meta-analytic estimates of favorability ratings for the most common selection procedures. We note, however, that much of this research on applicant preferences has asked respondents to give their reactions to different selection procedures simultaneously (e.g., asked their opinion about a cognitive ability test and also an interview). This raises a question about whether applicants' preferences for different types of assessments are quite so clear-cut when they consider individual assessments (as would be more common in most selection contexts) and not in comparisons to others. Further, we note that all assessments with a particular label are not equivalent (e.g., the use of different media in simulations; Bruk-Lee, Drew, & Hawkes, 2013), with considerable variability in content and fidelity. For instance, a non-job-related structured interview may be

Table 18.1 Meta-analytic estimates of favorability ratings for ten selection procedures

<i>Selection tool studied</i>	<i>Hausknecht Day, & Thomas (2004)</i>		<i>Anderson, Salgado, & Hülsheger (2010)</i>	
	<i>Mean</i>	<i>K</i>	<i>Mean</i>	<i>K</i>
Interviews	3.70	10	3.96	25
Work samples	3.61	10	3.84	23
Résumés	3.57	5	3.55	19
References	3.29	7	3.11	21
Cognitive ability	3.11	10	3.28	26
Biodata	2.81	8	3.06	19
Personality tests	2.83	10	2.91	25
Honesty tests	2.47	6	2.64	19
Personal contacts	2.51	6	1.85	22
Graphology	1.69	6	1.66	21

Note: Hausknecht et al. (2004) meta-analytic estimates are based on a 5-point scale; Anderson et al. (2010) meta-analytic estimates are calibrated to a 5-point scale.

viewed less favorably by applicants than a cognitive test containing job-related questions.

There are also important findings when it comes to applicant preferences within specific selection techniques. This is particularly evident with respect to job interviews, with research indicating that candidates prefer unstructured, as opposed to structured, interviews (Chapman & Zweig, 2005; Latham & Finnegan, 1993). This is not surprising, as candidates have more opportunity to voice their opinions and have stronger feelings of control in unstructured interviews (Madigan & Macan, 2005). Moreover, the standardized nature of structured interviews may make it more difficult for candidates to manage impressions (Posthuma, Morgeson, & Campion, 2002). Research also suggests that job applicants prefer face-to-face interviews over videoconferencing or telephone-based interviews (Bauer, Truxillo, Paronto, Weekley, & Campion, 2004; Chapman, Uggerslev, & Webster, 2003; Silvester, Anderson, Haddleton, Cunningham-Snell, & Gibb, 2000). For example, Chapman and colleagues (2003) found that face-to-face interviews were associated with higher levels of procedural justice and job acceptance intentions. Similarly, Bauer et al. (2004) found that face-to-face interviews were associated with higher levels of interpersonal justice, organizational attractiveness, and lower litigation intentions than questions asked and answered via technology. These findings may be due, in part, to the fact that interviews which are conducted in person are less contrived and may thus provide a more comfortable platform for interpersonal interaction.

Research also suggests that certain groups have preferences for specific selection tools. For example, Nikolaou and Judge (2007) found that a group

of students exhibited stronger preferences for ability, personality, and honesty tests than a group of employees. However, additional work is needed to assess whether the mechanism underlying the effect is due to role differences, age differences, and/or other factors. For example, the students in this sample were an average of ten years younger than the employees, and the observed differences may be due to different attitudes across the two groups. Cultural differences may also play a role in specific preferences. Indeed, Hoang, Truxillo, Erdogan, and Bauer (2012) found that individuals from the United States believe that employers have a greater right to obtain information from interviews, personal references, and personal contacts than do individuals from Vietnam.

As technological advances enable an impressive amount of flexibility, creativity, and realism to be built into computerized tools (Tippins, 2009), the newest online assessments need further examination for how applicants will react to them. To date, findings indicate that computerized ability tests are perceived equally or more positively than their paper-and-pencil counterparts (see Potosky & Bobko, 2004; Salgado, Moscoso, & Lado, 2003). This finding holds true for situational judgment tests (see Chan & Schmitt, 1997; Lievens & Sackett, 2006) and video-based résumés (Hiemstra, Deros, Serlie, & Born, 2012). There are, however, a number of important factors that may influence applicant reactions to computerized tests, including test anxiety (Oostrom, Born, Serlie, & Van Der Molen, 2010), computer anxiety (Wiechmann & Ryan, 2003), and computer efficacy (Potosky & Bobko, 2004; Sylva & Mol, 2009). The development of techniques to reduce these potential impediments is likely to have significant implications for job applicants.

Finally, researchers have started to examine different reactions to assessments administered via the Internet (see Bauer, Truxillo, Tucker, Weathers, Bertolino, Erdogan, & Campion, 2006; Konradt, Warszta, & Ellwart, 2013) which allow organizations to test large numbers of job applicants in a timely and cost-effective manner (Oostrom et al., 2010). In terms of applicant preferences, findings indicate that internet-based assessments are preferred by external, as opposed to internal, candidates, and are also preferred by internet-savvy individuals (Sylva & Mol, 2009). A primary concern with this type of assessment, however, is privacy (see Bauer et al., 2006). Privacy concerns are particularly salient given recent trends to use social networking sites for selection purposes (Roth, Bobko, Van Iddekinge, & Thatcher, 2013; Van Iddekinge, Lanivich, Roth, & Junco, 2016), as well as recent trends toward data sharing across employers (Bauer et al., 2006). We strongly encourage additional research that focuses on privacy concerns with respect to internet-based assessments. The conceptual model advanced by Bauer and colleagues (2006) provides a solid framework for additional work in this important area.

THE EFFECTS OF APPLICANT REACTIONS: INDIVIDUAL AND ORGANIZATIONAL OUTCOMES

Research has demonstrated that applicant reactions to selection processes can influence a range of individual and organizational outcomes. Gilliland (1993) proposed that perceptions of treatment during selection procedures can have an impact in three ways: during the hiring process, after hiring, and on applicants' self-perceptions. It has further been argued that selection process fairness (as opposed to outcome fairness) has been central to applicant reactions research because organizations have relatively little control over what outcomes applicants receive (Truxillo & Bauer, 2011). In the following section, we provide a summary of the empirical research on the relationship between applicant fairness reactions and a variety of individual and organizational outcomes.

Individual Outcomes

Self-perceptions

Gilliland (1993) proposed that procedural fairness and selection outcomes interact to affect self-perceptions (e.g., self-efficacy, self-esteem, and

core self-evaluations). Research supports the relationship between applicant reactions and several types of self-perceptions. For example, Bauer et al. (2001) reported that fairness reactions were positively related to self-esteem. Hausknecht et al. (2004) found a weak positive relationship between selection fairness and self-efficacy. A meta-analysis by Truxillo et al. (2009) showed that providing explanations affected applicants' fairness and self-perceptions. Further, several studies have found that fairness reactions were positively related to core self-evaluation (Anderson et al., 2012; Nikolaou & Judge, 2007). Research also supports the relationship between selection decisions and self-perceptions. A study by Fletcher (1991) examined the effects of selection decisions on applicants' self-esteem longitudinally and found that assessment decisions had a significant effect, with unsuccessful applicants showing a drop in self-esteem. Finally, research has found support for the moderating effects of process fairness and selection outcome on self-efficacy (e.g., Gilliland, 1994; Ployhart & Ryan, 1997). In summary, therefore, it is apparent that fairness perceptions among applicants have a number of effects upon self-perceptions such as self-efficacy, and core self-evaluations.

Positive and negative psychological effects

Anderson (2004) suggested the need for research related to the negative psychological effects of selection methods, most notably for those who received a rejection decision given the high ratio of rejected to selected candidates typical of selection situations. He argued that unsuccessful candidates – but especially those in internal promotion procedures – could, potentially, claim causal harmful effects upon their psychological well-being. Indeed several researchers have called for fundamental research into the mental health outcomes (e.g., well-being) of selection methods upon applicants (Ford, Truxillo, & Bauer, 2009; Truxillo & Bauer, 2011). However, only limited studies have been done in this area. Anderson and Goltsi (2006) explored the potential negative psychological effects of a managerial entry-level assessment center longitudinally. They found no evidence of negative psychological effects for rejected applicants. On the other hand, they found that positive effects and psychological well-being declined slightly for successful applicants. Schinkel et al. (2004) showed that the affective well-being of rejected participants who received performance feedback was significantly decreased compared to those who were rejected with no feedback. Bell et al. (2006) found that justice

expectations have a moderating influence, such that perceptions of justice have a greater influence on negative effects and psychological withdrawal when justice expectations are high.

Selection performance

Research has suggested that applicant reactions influence applicants' subsequent selection/test performance (actual and self-evaluation) (e.g., Chan, 1997; Chan & Schmitt, 1997; Gillespie & Ryan, 2012; Hausknecht et al., 2004). An interaction between process fairness and outcome fairness for self-assessed selection performance has also been observed (e.g., Ployhart & Ryan, 1997). Similarly, Ployhart and Ryan (1998) found that the relationship between outcome fairness and performance expectations was positive when the selection procedure was perceived as fair and negative when the selection procedure was perceived as unfair. At the same time, several studies found that selection fairness is influenced by perceived performance, providing evidence for a negative feedback loop, or a reciprocal relation between the two variables (e.g., Chan, Schmitt, Jennings, Clause, & Delbridge, 1998).

Organizational Outcomes

Job performance and criterion-related validity

Earlier reviews were critical of the lack of studies investigating whether applicant reactions had longer-term effects upon the critically important factor of job performance (Anderson, Born, & Cunningham-Snell, 2001; Hausknecht et al., 2004). This was a limitation in that applicant perspectives research had not unambiguously demonstrated the effect that applicant reactions could ultimately affect the most important of all outcomes for an organization – job performance. An early study by Gilliland (1994) reported that job-relatedness perceptions influenced job performance but no relationship was found between fairness perceptions and job performance. More recently, a study by McCarthy et al. (2013) found that perceptions of fairness across three samples in two continents were not related to job performance. Further, no effect was found either positively or negatively for applicant reactions upon criterion-related validity of test scores. This research raises the question of whether there are any circumstances by which applicant reactions may affect later job performance. One possibility is the consideration of internal applicant reactions and work performance in promotional

selection contexts (cf. Ford et al., 2009; Schaubroeck & Lam, 2004; Truxillo & Bauer, 2011), as the relationship between reactions and later performance is likely to be stronger among current employees than among external candidates.

Organizational attractiveness

A number of studies have found that selection fairness is positively related to organizational attractiveness (e.g., Ababneh, Hackett, & Schat, 2014; Anderson et al., 2012; Hausknecht et al., 2004; Schreurs, Derous, Proost, & Witte, 2010; Walsh, Tuller, Barnes-Farrell, & Matthews, 2010), and that this effect lasts over time (Bauer, Maertz, Dolen, & Campion, 1998). In their meta-analysis, Hausknecht et al. (2004) found that perceptions of procedural ($r=.44$) and distributive justice ($r=.34$) and organizational attractiveness were correlated. Furthermore, Lazer, Zinger, and Lachterman (2007) found that social fairness has an influence on job attractiveness. However, selection fairness may not affect applicants' organizational attractiveness when they are already highly attracted to the organization (Truxillo, Bauer, Campion, & Paronto, 2002).

Organizational commitment and job satisfaction

Gilliland (1993) proposed organizational commitment and job satisfaction as outcomes of selection fairness perceptions. Bauer et al. (2001) showed that social and structural fairness were positively related to organizational commitment. Robertson, Iles, Gratton, and Sharpley (1991) demonstrated that applicants who passed exhibited higher organizational commitment. Ryan, Sacco, McFarland, and Kriska (2000) found that applicants who self-selected out of the process had more negative perceptions of the organization and lower job commitment. In terms of job satisfaction, García-Izquierdo, Moscoso, and Ramos-Villagrasa (2012) found that procedural justice was positively related to job satisfaction in a promotional selection context. The most compelling study in this topic is perhaps the longitudinal field study by Ambrose and Cropanzano (2003). They found that the perceived fairness of promotional procedure was related to job satisfaction and organizational commitment. Additional systematic work examining the effects of fairness reactions on job satisfaction and organizational commitment is needed (Truxillo & Bauer, 2011). To be specific, these outcomes may be best examined longitudinally as an outcome of internal applicant reactions to promotion, where these outcomes are more

proximal to the selection situation, rather than an entry-level selection context.

Recommendation intentions

Research has supported the positive relationship between applicant fairness reactions and intentions to recommend the organization to others as a potential employer (e.g., Ababneh et al., 2014; Bell et al., 2006; Geenen, Proost, van Dijke, de Witte, & von Grumbkow, 2012; Giumetti & Sinar, 2012; Hausknecht et al., 2004; Schreurs et al., 2010). Perceptions of fairness have also been found to influence recommendation intentions among internal candidates applying for promotions (McCarthy, Hrabluik, & Jelley, 2009). However, some research has found that the relationship may weaken over time (Bauer et al., 1998; Gilliland, 1994), suggesting that such recommendation intention effects may be rather short-lived.

Litigation intentions and actual legal challenges

Gilliland (1993) proposed legal battles as an outcome of perceived fairness. Anderson (2011a) proposed a model and process of '*perceived job discrimination*' to suggest that applicants who perceive extremely unfair treatment or outcomes may, in certain circumstances, be minded to lodge complaints and even initiate expensive legal action against a recruiter organization. The legal ramification of applicant reactions might be the most important reason that many organizations are interested in applicant reactions to selection procedures. Empirical research in laboratory settings has supported the negative relationship between selection fairness and litigation intentions (Ababneh et al., 2014; Bauer et al., 2001; Bauer et al., 2004), and likelihood of complaints (Thibodeaux & Kudisch, 2003). In a field sample of actual job applicants, Geenen et al. (2012) found that distributive justice expectations were negatively related to litigation intentions, particularly in the presence of negative effects. However, no empirical studies have explored the relationship between applicant fairness reactions and actual legal outcomes, which remain the weakest link in applicant reactions research (Anderson, 2011b; Truxillo & Bauer, 2011). Moreover, litigation intentions and taking actual legal actions are very different, at least partially because proceeding with a lawsuit requires a great effort from the applicant. This is a shortcoming in our understanding of negative applicant reactions at the extremes of the spectrum and given the costs to an organization, both financial and reputational, of having to defend such legal actions, this is an area where we feel much more research is needed.

Process satisfaction

Research on the relationship between selection fairness and process satisfaction has suggested that applicant fairness reactions are positively related to satisfaction with the selection process and perceptions of selection system, and that this relationship lasts over time (Macan, Avedon, Paese, & Smith, 1994; Truxillo, Bauer, & Sanchez, 2001). Giumetti and Sinar (2012) reported that procedural fairness had a strong relationship with process satisfaction. Also, Hausknecht et al.'s (2004) meta-analysis found that fairness dimensions were positively correlated ($r=.36$ for perceived predictive validity and $r=.39$ for face validity) with attitudes about selection processes.

Turnover intentions

Surprisingly, rather limited research has been done into the effects of applicant reactions upon intention to quit. Truxillo et al. (2002) found no relationship between providing fairness information and later turnover intentions among those hired. These findings may be due to the nature of the sample (police applicants), as they were already highly attracted to the organization. Another study by Ambrose and Cropanzano (2003) showed that fairness perceptions regarding a promotional procedure are significantly related to turnover intentions over time. Hausknecht et al. (2004) were not able to include work behavioral outcomes, such as applicant turnover, withdrawal, and organizational commitment, in their meta-analysis due to the lack of studies into these outcomes. The reason is that these behaviors are not applicable in entry-level contexts, where most applicant reactions research has been conducted, since external applicants often have little at stake and minimal knowledge about the organization (Truxillo, Steiner, & Gilliland, 2004). Again, we propose that turnover intentions resulting from early applicant reactions is a potentially fruitful area for additional future research.

Withdrawal

A review of the few existing studies on this topic provides equivocal results. Ployhart and Ryan (1998) found that process fairness was related to withdrawal from the selection process. Another study by Schmit and Ryan (1997), based on interviews with applicants who withdrew from the police selection process, reported that about 12% of applicants mentioned the procedural injustice as a reason for withdrawing. On the other hand, Ryan et al. (2000) found that applicant perceptions were generally unrelated to withdrawal behavior. Also, Truxillo et al. (2002) found no relationship between selection information and continuation in the selection process; Truxillo et al. noted that this may be

due to the nature of the sample (i.e., police applicants) as they were highly attracted to the organization; thus, these results may not be applicable to all applicant pools.

Reapplication intentions

In one of the few studies on reapplication intentions, Ployhart and Ryan (1997) found interactions between process and outcome fairness influencing reapplication intentions, such that when individuals perceive a fair process, there is essentially no relationship between outcome fairness and reapplication intentions. However, when individuals perceive an unfair process, there is a strong negative relationship between reapplication intentions and outcome fairness. LaHuis, MacLane, and Schlessman (2007) also found a relationship between justice and reapplication intentions, such that the relationship was stronger when perceived performance was high. Furthermore, Ryan, Boyce, Ghumman, Jundt, and Schmidt (2009) found that intention to apply for a job was influenced by perceptions of fairness. Finally, a study by Gilliland et al. (2001) reported that applicants receiving an explanation based on fairness in a rejection letter were at least twice as likely to reapply to the organization than those who received a standard rejection letter. In other words, the fairness explanation appeared to improve actual reapplication behavior.

Customer purchase intentions

Some research has suggested that there is a relationship between applicant reactions and both purchase intentions (Macan et al., 1994; Wiechmann & Ryan, 2003) and service intention (Maertz, Mosley, Bauer, Posthuma, & Campion, 2004). This positive relationship between selection fairness (job relatedness) and purchase intentions ($r=.14$) was generally supported by Hausknecht et al.'s (2004) meta-analysis. Also, Rolland and Steiner (2007) reported that improving selection fairness by providing an explanation improved intention of rejected applicants to use the organization's services. We encourage future research to examine the impact of reactions on applicants' actual purchasing behaviors and brand image perceptions, particularly given the vast applicant pools that technology-based selection systems have enabled organizations to examine.

Job acceptance

The relationship between applicant reactions and job acceptance intentions has received considerable support. For example, the meta-analytic results of Hausknecht et al. (2004) and several studies have found a positive relationship between selection fairness, selection expectations, and job

acceptance intentions (e.g., Bell et al., 2006; LaHuis, 2005; Ryan et al., 2009; Schreurs et al., 2010; Truxillo et al., 2002). With regard to the actual job acceptance decision as an outcome, however, studies have produced more mixed findings. For example, Carless (2006) reported that applicants' job acceptance decision was unrelated to applicant reactions to selection characteristics; on the other hand, a study by Walsh et al. (2010) showed that fairness perceptions were positively related to actual job acceptance.

Summary

Our review of the applicant reactions literature has suggested that their reactions to selection process and fairness relate to various individual and organizational outcomes – several of which are of considerable importance. Although the effects of applicant reactions on many of these outcomes seem clear, these effects appear to vary over time and context, particularly whether the study concerns external applicants versus promotions where emotions can run high. Applicant perspective research has come of age in the sense that over recent years major advances have included several meta-analyses summarizing individual primary studies and research issues (e.g., Anderson et al., 2010; Hausknecht et al., 2004; Truxillo et al., 2009), and a number of narrative reviews (e.g., McCarthy, Bauer, Truxillo, Anderson, Costa, & Ahmed, 2017) have been published summarizing the literature to date.

ANTECEDENTS AND MODERATORS OF APPLICANT REACTIONS

Other factors besides the hiring process have been shown to be antecedents of applicant reactions, and a number of factors have been shown or hypothesized to moderate these reactions. We describe these below.

Antecedents

One important consideration is that despite what organizations may try to do to affect applicant reactions, such reactions are a function of variables outside of the organization's control. An example of such individual differences is applicant personality. Truxillo, Bauer, Campion, and Paronto (2006) examined whether applicant Big Five personality measured at baseline affected later applicant reactions in terms of fairness, self-perceptions, and

organizational attractiveness. They found that personality variables related to applicant perceptions after controlling for the applicant's test score: neuroticism had a negative relationship with reactions, and agreeableness had a positive relationship. Honkaniemi, Feldt, Metsäpelto, and Tolvanen (2013) found that certain personality profiles (e.g., 'resilient') had more positive reactions than others (e.g., 'overcontrolled'). Similarly, Viswesvaran and Ones (2004) found that individual differences predicted the importance of various selection system characteristics, for example, that those higher in cognitive ability emphasized the content of the selection procedure, and extraverts valued the process of developing the selection procedure. Taken together, these studies suggest that applicant individual differences may dispose them to react in certain ways to the hiring process, regardless of what the process itself involves. However, a range of other individual differences, such as core self-evaluations, emotional intelligence, and integrity (all of great interest in the W/I/O psychology literature) remain relatively unexplored in the realm of applicant reactions.

Moderators

There are a number of moderators that can be considered in the study of applicant reactions and test-taking predispositions. For example, external job applicants versus internal candidates up for promotion may have different reactions and predispositions. Although external candidates have received the overwhelming degree of research attention in the applicant reactions literature, internal candidates for promotion appear to have relatively strong reactions (e.g., Ambrose & Cropanzano, 2003; Truxillo & Bauer, 1999), suggesting that this is an important moderator to consider. Moreover, internal candidates obviously have much more information about the organization, making their reactions more stable; on the other hand, such an established relationship with the organization may also make disappointing results a form of contract breach – a serious concern to the organization.

Despite calls in the literature for increased empirical examination of internal candidates' reactions, there have been relatively few studies of this issue in recent years (for exceptions see Giumetti & Sinar, 2012; McCarthy et al., 2009). However, Ford et al. (2009) make a compelling argument that the effects of either rejection (low outcome favorability) or negative reactions among internal candidates can have serious negative performance consequences for the organization, and can also affect a number of outcomes including applicant stress outcomes. In other words, the

differential effects of applicant reactions among internal candidates is a potentially critical concern for organizations, and its potential effects on stress and well-being outcomes may have societal consequences as well.

Another moderator that may be important to understanding reactions is differences in the national and cultural context, with differences in applicant expectations for the hiring process and for employer behavior, and differences in terms of legal protections during the hiring process. Although such international differences are discussed elsewhere in this chapter (and generally show few differences in which selection procedures applicants prefer), we note that research has found international differences in the effects of justice across cultures (Shao, Rupp, Skarlicki, & Jones, 2013). Such findings suggest that future cross-cultural research may want to focus less on differences in reactions to specific selection procedures and more on how applicant perceptions of selection affect their later attitudes toward themselves and the employer, as well as actual behavioral differences.

CROSS-NATIONAL SIMILARITIES AND DIFFERENCES IN APPLICANT REACTIONS

There has been considerable ongoing debate over whether applicant reactions are primarily caused by within-country cultural effects (so-called '*situational specificity*') or whether, conversely, reactions are more a function of a general pattern of responses that is common across countries and cultures (so-called '*reaction generalizability*' by Anderson et al., 2010). Certainly, the role of cultural values in applicant perceptions is a concern for multinational organizations seeking to standardize selection practices, especially with the growing number of multinational organizations. This has arguably attracted the attention of many researchers to the issue applicant reactions across various countries (e.g., Anderson et al., 2012; Anderson & Witvliet, 2008; Hoang et al., 2012).

A recent meta-analysis by Anderson et al. (2010) using 38 independent samples and covering 10 popular selection procedures found considerable similarity in reaction favorability. They found that applicants generally prefer certain selection methods (e.g., interview and work sample test), whereas other methods are least preferred (graphology, honesty tests, and personal contacts) across cultures. Moreover, Ryan and colleagues (2009) examined applicant reactions to 8 selection methods across 21 countries. They found that perceptions of selection methods were mostly similar across individuals holding different cultural values, showing greater

convergence than divergence regarding applicant perceptions globally. Interestingly, they also found that a country's gross domestic product was negatively related to both applicants' predictive validity and fairness perceptions.

Steiner and Gilliland (2001) suggest that some cultural dimensions are most likely to influence the salience of various distributive and procedural justice rules. One example is Hofstede's (1980; 2001) notion of uncertainty avoidance and its relation to the legal and political systems' characteristics. As the laws against discrimination in the US are explicit, American applicants might be more aware of their rights and opportunities to act in response to the perceived unfairness of discrimination (Truxillo et al., 2004). Another study by Walsh et al. (2010) examined the moderating role of societal culture (performance orientation and uncertainty avoidance) on the effects of selection fairness perceptions. These authors found that performance orientation moderates the effect of structural fairness perceptions on organizational attractiveness with a stronger relationship seen among applicants from more performance-oriented countries. Also, Harris, Van Hove, and Lievens (2003) examined cross-cultural differences in privacy perceptions of an internet-based selection system and found a few significant differences between the US and Belgian respondents. However, the role of culture on applicant reactions to selection procedures warrants further investigation. In Table 18.2, we provide a summary of research linking Hofstede's cultural dimensions to procedural justice of personnel selection based on the applicant reactions literature (i.e., Bertolino & Steiner, 2007; Phillips & Gully, 2002; Steiner & Gilliland, 2001; Walsh et al., 2010).

We suspect that applicant reactions will have 'core' elements of a basic response that are internationally generalizable, but also that there will be more local, culturally specific 'surface reactions' that need to be considered by employers. One meta-analytic finding in particular is important here – that applicant reactions have been found to correlate positively with the criterion-related validity of popular selection predictor methods (Anderson et al., 2010) – suggesting that organizations using more valid methods are likely to also elicit more positive reactions from candidates.

TEST-TAKING DISPOSITIONS AND REACTIONS

Test-taking dispositions are related to stable individual differences, such as personality traits, and include test-taking anxiety, test-taking motivation,

and test-taking self-efficacy (Arvey, Strickland, Drauden, & Martin, 1990; Chan & Schmitt, 2004; Ryan & Ployhart, 2000). For example, test-taking anxiety and test-taking efficacy have been linked to neuroticism (e.g., Chamorro-Premuzic, Ahmetoglu, & Furnham, 2008), while test-taking motivation has been linked to conscientiousness (e.g., Salgado, Remeseiro, & Iglesias, 1996).

Research on test-taking dispositions originated in the educational realm, with studies examining test-taking anxiety among high school and university students (see meta-analyses by Hembree, 1988; Seipp, 1991; Spielberger & Vagg, 1995). The majority of these studies assessed general measures of anxiety by administering the State-Trait Anxiety Inventory (Spielberger, 1983). Findings were unequivocal, with meta-analytic reviews demonstrating that test-taking anxiety has significant negative effects on test performance (see Hembree, 1988; Seipp, 1991). Later research in this area introduced the concepts of test-taking motivation (e.g., Sundre & Kitsantas, 2004; Wolf & Smith, 1995) and test-taking self-efficacy (e.g., Díaz, Glass, Arnkoff, & Tanofsky-Kraff, 2001; Smith, Arnkoff, & Wright, 1990), each of which demonstrated positive effects with test performance.

The concept of test-taking dispositions was introduced to the domain of personnel selection by Arvey and colleagues (1990), whose seminal work included the development of an instrument for assessing applicant reactions to employment tests. Their instrument, the Test Attitude Survey (TAS), contains nine dimensions: motivation, lack of concentration, belief in tests, comparative anxiety, test ease, external attribution, need for achievement, future effects, and test preparation. The TAS provided the foundation for a number of studies on the test-taking dispositions of job applicants, the majority focusing on test anxiety and motivation – the scales with the strongest psychometric properties (McCarthy & Goffin, 2003). The work by Arvey and colleagues also triggered a number of studies that operationalized test-taking dispositions in unique ways. In the sections below, we review this research, beginning with the theories and findings for test-taking anxiety, followed by test-taking motivation, and concluding with test-taking self-efficacy.

Test-taking Anxiety

Many applicants experience feelings of nervousness when confronted with selection tests because a selection decision can be a life-changing event that may require a major career and life shift. Unfortunately, high levels of anxiety among

Table 18.2 Hofstede's cultural dimensions and procedural and distributive justice in personnel selection

<i>Cultural dimensions</i>	<i>Procedural justice dimensions</i>	<i>Key assumptions</i>
Uncertainty Avoidance	• Job relatedness • Opportunity to perform • Consistency of administration	Because of the greater societal concern with avoiding ambiguity, applicants from uncertainty-avoidant cultures may be expected to: • Place greater emphasis on having clearly defined procedures and having the opportunity to ask questions about the process, thus minimizing ambiguity associated with the hiring process as much as possible. • Prefer selection procedures that would give them more perceived control or voice in the selection, typically operationalized as opportunity to perform. Applicants from less uncertainty-avoidant cultures should place less value on the level of explanation about the selection procedures as a result of greater societal tolerance for ambiguous situations. Consequently, information selection fairness should be more influential for applicants from more uncertainty-avoidant cultures relative to applicants from cultures low in uncertainty avoidance.
Individualism/Collectivism	• Job relatedness • Opportunity to perform • Consistency of treatment	Individuals from an Individualist culture often: • More concerned about their opportunity to perform and job relatedness to demonstrate their skills and abilities that differentiate them from others. • Emphasize on the equity to one's input to be fair (distributed justice). Individuals from a Collectivist culture often: • Emphasize the equality of treatment, as they are willing to sacrifice personal initiative for group goals. • Are more likely to avoid using explicit, individual comparison for selection.
Masculinity/Femininity	• Job relatedness • Opportunity to perform • Reconsideration • Two-way communications • Interpersonal sensitivity	Individuals from a high Masculinity culture often: • Emphasized job relatedness and opportunity to perform due to the achievement-oriented nature of masculinity culture. Individuals from a high Femininity culture often: • Emphasize social harmonies.
Power Distance	• Opportunity to perform • Process information • Two-way communications • Decision justification • Interpersonal sensitivity • Respectful of privacy • Right to obtain information	Individuals from high in power distance often: • Believe that some individuals are destined to be in leader roles and other are not. • Assume that managers in organizations have the right to access information that will enable them to make a more effective selection decision regardless of the impact on the applicants. • Are less likely to be influenced by procedural justice dimensions (privacy, employer's right to obtain information and interpersonal warmth) in determining the favorability of selection techniques. • Concerned whether they would receive fair treatment (distributed justice). Individuals from low in power distance often: • Concern about the potential abuses and misuses of their private information. • Sensitive to whether employers have the right to obtain certain information and whether or not the procedure violates or respects the privacy of applicants.

Adapted, extended, and updated from: Bertolino and Steiner (2007), Steiner and Gilliland (2001), Phillips and Gully (2002), and Walsh, Tuller, Barnes-Farrell, and Matthews (2010).

applicants can result in applicant withdrawal from the selection process, lower levels of organizational attractiveness, and reduced intentions to recommend the organization to others (Arvey et al., 1990; Hausknecht et al., 2004; McCarthy et al., 2009; McCarthy & Goffin, 2004; Ryan, 2001; Schmit & Ryan, 1997).

Test-taking anxiety is also directly related to lower scores on selection tests (Hausknecht et al., 2004; McCarthy et al., 2009). Cognitive interference theories provide the foundation for understanding this relation (e.g., Processing Efficiency Theory; Eysenck & Calvo, 1992; Attentional Control Theory; Eysenck, Derakshan, Santos, & Calvo, 2007; Integrative Resource Theory; Kanfer & Ackerman, 1989). These theories assert that anxiety interferes with an individual's ability to attend to and process performance-relevant information, resulting in lower levels of performance. Applied to selection contexts, this means that high levels of anxiety may inhibit an applicant's ability to process and understand selection procedure content, resulting in lower levels of performance and a reduced probability that they will be accepted for the job. Consistent with this proposition, high levels of test-taking anxiety have been found to be positively related to cognitive interference in selection (Ryan & Chan, 1999) and promotional (McCarthy et al., 2009) contexts. Test-taking anxiety has also been found to exhibit negative relations with test performance (e.g., Arvey et al., 1990; Hausknecht et al., 2004; McCarthy et al., 2013), job interview performance (Cook, Vance, & Spector, 2000; McCarthy & Goffin, 2004) and performance on the job (McCarthy et al., 2013).

These findings have led several researchers to suggest that anxiety may reduce the criterion-related validity of selection tests, such that high levels of anxiety may introduce extraneous variance into test scores and reduce the extent to which the scores reflect applicants' true ability levels (e.g., Arvey et al., 1990; Ryan & Ployhart, 2000). In line with this proposition, there is evidence that a composite measure of test attitudes, which included test-taking anxiety, differentially moderated the validity of a cognitive ability test (more valid) and a personality test (less valid) in a lab setting (Schmit & Ryan, 1992). In contrast, a recent field study with job applicants found that test-taking anxiety did not have any effect on the validity of selection tests (McCarthy et al., 2013). This latter finding is consistent with research by Reeve and Bonaccio (2008) who found that test anxiety has no significant influence on observed test scores.

Combined, these findings demonstrate that test anxiety impacts both test performance and job performance and is therefore an important

consideration for both applicants and organizations. This highlights the value of training programs to help applicants minimize test anxiety. At the same time, findings generally indicate that test validity is not affected by anxiety, that is, test scores predict who will do well on the job regardless of applicant levels of anxiety, providing additional support for the use of standardized tests in selection contexts.

Research also finds evidence of gender differences in test and interview anxiety, with females typically scoring higher than males (Cassady & Johnson, 2002; Sieverding, 2009). At the same time, findings indicate that anxiety is actually more detrimental to the performance of male candidates (Feiler & Powell, 2013; McCarthy & Goffin, 2005). As detailed by McCarthy and Goffin (2005), this is likely due to the fact that females are more efficacious in coping with the stress experienced during testing situations. Thus, while females experience higher levels of test-taking anxiety, results suggest that this does not put them at a disadvantage in test-taking situations. Future research that focuses on coping strategies for male applicants may prove particularly helpful. Job applicants from minority groups are also more likely to experience high levels of test anxiety due to stereotype threat (Ployhart, Ziegert, & McFarland, 2003). This may be because minority candidates are *expected* to perform worse on tests given decades of research findings which indicate that Blacks and Hispanics consistently score lower than Whites (see Nguyen & Ryan, 2008). Minority candidates experience stereotype threat (see Steele & Aronson, 1995) when they worry that their test performance will validate the negative stereotype (Ployhart et al., 2003). Stereotype threat has been found to be related to higher levels of test-taking anxiety, and lower levels of test-taking motivation, test fairness, belief in tests, and test-taking efficacy (Arvey et al., 1990; Chan, Schmitt, DeShon, Clause, & Delbridge, 1997; Ployhart et al., 2003; Schmit & Ryan, 1997). There is minimal evidence, however, that stereotype threat actually accounts for sub-group differences in actual selection test performance (see Ployhart & Harold, 2004; Sackett & Ryan, 2012). Thus, future research is needed on the *mechanism* by which stereotype threat may have influence on test-taking reactions and test performance in personnel selection samples.

Finally, there has been considerable theoretical and empirical work on the conceptualization and measurement of anxiety in selection contexts. With respect to job interviews, McCarthy and Goffin (2004) developed a model of anxiety which contains five dimensions: Appearance Anxiety, Communication Anxiety, Social Anxiety,

Behavioral Anxiety, and Performance Anxiety. Findings indicated that candidates experience varying levels of the five interview anxiety types, and that overall interview anxiety is negatively related to interview performance. With respect to selection tests, Proost, Derous, Schreurs, Hagtvet, and De Witte (2008) developed a multi-dimensional instrument called the Self- versus Other-Referenced Anxiety Questionnaire (SOAQ). Self-Referenced Anxiety reflects concerns that originate from internally driven pressures (e.g., the candidate is worried about obtaining a low score because s/he will blame themselves for poor performance), while Other-Referenced Anxiety reflects concerns that originate from externally driven pressures (i.e., the candidate is worried about obtaining a low score because others will blame them for poor performance). Findings indicated that self-referenced test anxiety demonstrated a positive relation with test performance, while other-referenced test anxiety demonstrated a negative relation with test performance.

Combined, these studies provide a more nuanced perspective into the nature and effects of anxiety in selection contexts and answer calls for increased focus on the dimensions of applicant reactions (Chan & Schmitt, 2004). They also have important implications for future research on applicant anxiety, as different types of anxiety may exhibit unique relations with core outcomes, such as test performance, job performance, and test-taking attitudes. Understanding how the various dimensions of anxiety operate is also particularly useful for the development of training interventions that can focus on more specific strategies and techniques.

Test-taking Motivation

Applicants also vary in the extent to which they are motivated to do well on selection tests. Consistent with Gilliland's (1993) model, results generally indicate that test-taking motivation is an outcome of process fairness (e.g., Bauer et al., 2006; Hausknecht et al., 2004). Findings also reveal that job applicants with high levels of test-taking motivation are less likely to withdraw from the selection process (Schmit & Ryan, 1992; 1997), more likely to achieve high test scores in selection contexts (Hausknecht et al., 2004), and more likely to achieve high scores in promotion contexts (McCarthy et al., 2009).

As with test-taking anxiety, these findings have led to concerns that differences in applicant motivation to perform on selection tests may result in biased estimates of their true qualifications (Ryan &

Ployhart, 2000; Smither, Reilly, Millsap, Pearlman, & Stoffey, 1993). Evidence examining this issue is mixed. Specifically, a study by Schmit and Ryan (1992) found that a composite measure of test-taking attitudes (which included test motivation) moderated the validity of a cognitive ability and personality test in a lab setting. Similarly, O'Neill, Goffin, and Gellatly (2010) found that test-taking motivation moderated the validity of a test assessing the trait of steadfastness in an applied context. More recently, McCarthy and colleagues (2013) found no evidence that test-taking motivation influenced the criterion-related validity of selection tests. Future research that aligns test-taking motivation with the constructs assessed in the selection test (e.g., tests assessing achievement and/or drive; cognitive skills) and the constructs assessed in job performance (e.g., core task performance, extra-role behaviors) may provide additional insight into motivation's role as a moderator.

From a psychometric perspective, one of the most popular instruments for assessing test-taking motivation is the motivation subscale of the TAS, which was developed by Arvey and colleagues in 1990. More recently, Sanchez, Truxillo, and Bauer (2000) developed a measure of test-taking motivation based on expectancy theory. This was the first study to link test-taking motivation to an established motivation theory, as well as the first to conceptualize test-taking motivation as a multi-dimensional construct. Their measure, the Valence, Instrumentality, Expectancy Scale (VIEMS), boasts strong psychometric properties and contains three subscales: Valence, or the attractiveness of obtaining a position; Instrumentality, or the extent to which applicants feel that high test performance will result in a job offer; and Expectancy, or the probability that effort will lead to a high test score. The three dimensions of the VIEMS have been found to explain variance in actual test performance, perceived test performance, and test-taking experience (Sanchez et al., 2000). Moreover, the valence and instrumentality scales have been found to exhibit positive relations with applicant emotional stability, extraversion, and positive affect (Bott, Snell, Dahling, & Smith, 2010). Ultimately, the VIEMS enables more nuanced theory-based assessments of the antecedents, consequences, and processes associated with the components of test-taking motivation. Future research should examine the role that the three components of test-taking motivation have with respect to different types of applicants, different types of selection tests, and/or different types of jobs. Moreover, Ryan (2001) notes the dynamic nature of dispositions such as motivation (an issue that is likely true for most applicant reactions; Chan & Schmitt, 2004), but this area has received little attention.

Test-taking Self-efficacy

Self-efficacy refers to the belief that one can succeed on a certain task (Bandura, 1982) and has been found to have a strong relation with job performance (Sadri & Robertson, 1993). This holds true in selection contexts, as applicants who perceive that they may not do well on a selection test, or who demonstrate low levels of test-taking efficacy, typically obtain lower test scores (Bauer et al., 1998; McCarthy et al., 2013; Ryan, Ployhart, Greguras, & Schmit, 1998). Individuals with low levels of test-taking efficacy are also more likely to have high test-taking anxiety, low levels of test-taking motivation, and reduced belief in tests (McCarthy et al., 2013; Ryan et al., 1998).

Gilliland (1993) suggested that perceptions of justice are likely to influence self-efficacy perceptions. In support of this proposition, Bauer et al. (1998) found that perceptions of procedural fairness explained variance in test-taking self-efficacy beyond outcome favorability (i.e., whether candidates passed or failed). At least three additional studies have found that selection fairness is related to self-efficacy (Maertz, Bauer, Mosley, Posthuma, & Campion, 2005; Truxillo et al., 2001; Truxillo et al., 2002). These findings highlight the value of ensuring that selection tests are viewed as fair, as fair selection systems can serve to boost candidate efficacy. Other potential antecedents of efficacy that have been empirically supported are: being male, being hired with a similar test in the past, and general levels of self-efficacy (Maertz et al., 2005). Thus, future work that focuses on gender differences with respect to test-taking efficacy, as well as specific techniques for improving test efficacy is likely to prove valuable.

Dispositional versus Situational Reactions

In contrast to dispositional reactions, situational reactions reflect more transient, time-bound experiences. Given that fairness perceptions are more specific to the characteristics of the selection process than are test-taking anxiety, motivation, and self-efficacy, they are more *situational* in nature (Chan & Schmitt, 2004; McCarthy et al., 2013). Theoretically, dispositional and situational reactions are expected to have differential relations with key variables. Specifically, reactions that are more situationally based (e.g., perceptions of fairness) are likely to exhibit significant relations with proximal outcomes (e.g., test-taking performance, applicant withdrawal behaviors), but non-significant relations with distal outcomes (e.g., job performance, turnover) because the situation-specific nature of these reactions makes

it unlikely that they will influence how applicants behave on the job. In contrast, dispositional test-taking reactions (e.g., test-taking anxiety) are likely to exhibit significant relations with both proximal (e.g., test-taking performance, withdrawal behaviors) and distal (e.g., job performance, turnover) outcomes. These propositions are consistent with affective events theory (Weiss & Cropanzano, 1996), the theory of attitude-behavior relations (Ajzen & Fishbein, 1977), and models of job performance (e.g., Campbell, McCloy, Oppler, & Sager, 1993), each of which holds that attitude-behavior relations are strongest when they are proximal in duration and focus.

Empirical research findings support these propositions, as perceptions of fairness have been found to be related to test-taking performance and recommendation intentions, while test-taking anxiety and motivation have been found to be related to test-taking performance, applicant withdrawal, and performance on the job (see Hausknecht et al., 2004; McCarthy et al., 2013). Future research is needed to examine whether situational reactions also exhibit stronger relations with proximal *antecedents* (e.g., procedural characteristics), and whether dispositional reactions also exhibit stronger relations with distal *antecedents* (e.g., organizational image).

DESIGN ISSUES: RECOMMENDED DESIGNS FOR APPLICANT PERSPECTIVE RESEARCH

From early in its development, the applicant reactions literature had begun to emphasize longitudinal and time-lagged designs. The primary reason for this approach is that it is not enough to assess applicant perceptions after a selection procedure. Rather, it is important whether or not to attribute any post-selection reactions to the selection procedure, or to pre-existing perceptions on the part of the applicant. Put differently, the question is whether applicant perceptions *changed* as a result of the selection procedure, or were they already developed when the applicant came into the selection system. That said, many applicant reactions studies have been conducted in laboratory settings, or have not measured applicant reactions at the appropriate time (e.g., after feedback). Accordingly, studies have generally not examined the dynamic nature of applicant reactions (see Chan & Schmitt, 2004) and how applicant reactions and affect may change over time. Below, we describe the contexts within which applicant reactions studies are typically, or can be, conducted and some typical design issues associated with each.

Laboratory Studies

Much of the applicant reactions research has used laboratory studies of undergraduate applicants, either reacting to selection scenarios (e.g., Steiner & Gilliland, 1996) or subjected to different selection procedures (e.g., Gilliland, 1994). Such samples are attractive for a number of reasons: Participants can legally and ethically be assigned to different selection conditions and any differences in their treatment can be attributed to the selection procedure. On the other hand, students in simulated conditions are not actual applicants and have little at stake in the hiring process, and real applicants often have numerous factors that could affect their reactions to an organization (e.g., perceptions of an employer's 'brand', their own need for employment) besides the selection procedure. In fact, it is unclear from meta-analytic studies whether the results of laboratory studies over-estimate the effects of applicant reactions or under-estimate them (Hausknecht et al., 2004; Truxillo et al., 2009).

Applicant Samples in Field Contexts

One of the primary reasons for the development of longitudinal designs in applicant reactions research is particular to the challenge of conducting field studies with actual applicants: Participants cannot be randomly assigned to experimental conditions. That is, it would be unethical and impractical, and in many countries illegal, to expose different applicants within the same cohort to different selection procedures or to differential treatment that may in some way affect their performance in the hiring process. For that reason, longitudinal designs allow for the measurement of baseline perceptions prior to the hiring process so that applicants can act as their own control in the hiring process. This is particularly true when assessing outcomes that focus on the individual (e.g., self-efficacy) or perceptions of the organization (e.g., organizational attractiveness): Applicant self-efficacy or organizational attractiveness would be measured prior to testing and used as control variables in assessing post-test reactions. However, when the outcome of interest is focused on the selection procedure itself – most typically, fairness perceptions of the hiring process – the approach is slightly different, because applicants cannot have developed perceptions of the hiring process prior to the process when they know little about it. Instead, *surrogate* measures are often used, such as general perceptions of how fair it is to test applicants.

It is possible under certain conditions to assign applicants to conditions in field settings, with the conditions based on pre-existing groups. For example, Truxillo et al. (2002) used a quasi-experimental design to assign police applicants to 'no explanation' and 'explanation' conditions, with applicants in each condition coming from separate cohorts of applicants six months apart, or, naturally occurring groups of applicants who failed or who passed a selection procedure could also be compared. With these sorts of quasi-experimental designs (see Cook, Campbell, & Peracchio, 1990), baseline (pre-selection) measures become particularly important to account for any pre-existing differences in applicants and account for any differences statistically (e.g., as control variables in a regression analysis). Although these quasi-experimental designs have not been used much in the applicant reactions literature, we encourage their use in future because of their ability to compare how the differential treatment of applicants affects applicant outcomes. Alternatively, when the research question is appropriate, the assignment of actual applicants to experimental conditions pre-selection (e.g., using a quasi-experiment; Truxillo et al., 2002) or post-selection (e.g., providing different treatment to applicants after a selection decision; e.g., Gilliland et al., 2001) is sometimes possible and can also allow for comparisons between applicants exposed to different experimental treatments. Such studies would eliminate any question as to whether any results are attributable to applicant reactions or from some artifact of the unrealistic settings presented to student samples. Further, it is through such field studies that we can come to identify the factors in the hiring process that can affect individual applicants, organizations, and society as a whole.

Summary

A large number of applicant reactions studies have been conducted in laboratory settings using undergraduates, primarily because of the greater control provided as well as the ability to manipulate factors (e.g., unfair procedures; Ployhart & Ryan, 1998) that might not be possible in the field. Field studies provide greater realism and thus greater generalizability to the real world, primarily because they reflect actual factors (e.g., applicant motivation) that may affect applicant perceptions. At the same time, field studies raise challenges in terms of requirements that baseline (pre-selection) perceptions be measured and statistically controlled.

GUIDELINES FOR HRM/SELECTION PRACTITIONERS

Throughout this chapter we have highlighted the abundant academic research which has been conducted to date on applicant reactions. This is a critical part to our understanding of the complex and important aspects of IWO psychology. However, as Rynes (2007) wrote in her *Academy of Management Journal* Editorial ‘What academics and practitioners can do, alone and together’, we agree that there is a great need for research translation and knowledge transfer. To this end, this section of our chapter is focused on sharing such a research translation. We do this by building upon a recently and jointly published set of professional society guidelines for selection practitioners which provide pragmatic and easy-to-understand evidence-based advice drawing upon applicant reactions research and how these findings can best be integrated into employee selection procedures by organizations (Bauer, McCarthy, Anderson, Truxillo, & Salgado, 2012). The guidelines were published jointly by the Society for Industrial and Organizational Psychology (SIOP) and the Society for Human Resource Management (SHRM) and give an application-orientated summary of research on the applicant’s perspective and especially the implications arising from research by IWO psychologists and crucial implications for the design of recruitment and selection procedures.

Overall, organizations have goals around applicant reactions which relate to avoiding negative reactions so that legal actions (e.g., lawsuits, formal complaints) and bad PR (e.g., negative word of mouth, low online ratings) are avoided or at least ameliorated. This is important because in today’s competitive selection climate, only a small fraction of those who apply for most jobs will ultimately be hired. On the flipside, organizations are also motivated to maximize the potentially positive reactions of applicants so that the best candidates will stay in the selection process, will accept potential job offers, and will be more effective once they are on the job. Taken together, organizations can benefit from a translation of applicant reactions research to actual employment settings.

Organizational Best Practices and Recommendations

To summarize some of the key points made in a recent white paper (Bauer et al., 2012), eight recommendations for practitioners are offered. (1) *Give explanations and/or justifications about*

selection procedures. Be sure to keep this relatively non-technical, but do share what the organization does, why it’s valid, and how it is used by the organization. While the outcome may not be the one that applicants desired, understanding ‘why’ is helpful. Relatedly, (2) *use job-related selection procedures.* As has been shown throughout the current chapter, applicants care whether or not the selection methods they experience appear and are job-related. This means that it’s important to (3) *examine the organization’s selection procedures to make sure they are scientifically sound (valid) and practically sound.* This is a basic point but one that is a starting point for good applicant reactions. (4) *Provide job applicants with an opportunity to perform.* Doing so helps them see the fairness of the process regardless of their actual performance on the selection procedure or their actual outcome. (5) *Provide timely feedback to job candidates about their application status.* No news is bad news in the mind of most job applicants. Avoid generating undue anxiety by giving applicants at least some degree of information about your timeline. (6) *Deal honestly with applicants.* This avoids a lot of potential problems down the line. (7) *Treat candidates with respect.* This recommendation holds for all potential interactions in the workplace. Respect goes a long way toward mutual understanding and avoiding potential conflict. And finally, (8) *encourage two-way communication.* To the degree that you are able to allow candidates some voice during the process, their reactions will be more strongly positive. In addition, Table 18.3 contains a ‘Best Practice Checklist’ which may be used by researchers and organizational practitioners to self-evaluate how they are doing to positively influence positive reactions for the applicants they encounter (Bauer et al., 2012).

Applicant Best Practices and Recommendations

For applicants, there are important points which emerge from the research done on applicant reactions. The following is a list of ‘do’s’ and ‘don’ts’ for applicants. *Do prepare (both mentally and physically) for selection procedures so you can perform your best and lessen test anxiety.* Find out all you can online and from the organization if there are ways you can prepare such as past tests, sample interview questions, etc. In addition, find out all you can about the organization’s culture and procedures by doing your homework about the organization. Finally, get yourself into the best shape: eat well, get a good night’s sleep, and take deep breaths

Table 18.3 Best Practice Checklist

Best Practice Checklist	
<i>Is your current selection system set for successful reactions? If so, it should be designed so that it is...</i>	
✓	<i>providing informative explanations to applicants.</i>
✓	<i>giving applicants a chance to show what they know.</i>
✓	<i>using selection methods that are job-related.</i>
✓	<i>using selection methods based on sound scientific evidence.</i>
✓	<i>giving timely feedback.</i>
✓	<i>giving informative feedback.</i>
✓	<i>treating applicants with respect throughout the selection process.</i>

Source: Bauer, McCarthy, Anderson, Truxillo, and Salgado (2012): *Candidate reactions to selections*.

to help you stay focused during long days of selection procedures. *Do ask for feedback if you advance to late rounds in the selection process before being rejected.* Learning why you were not selected this time can pay valuable dividends in future selection situations. It also signals a learning orientation and interest in the organization. *Do be open to feedback.* If you do receive feedback, it may or may not be positive, but be open to it and try to learn as much as possible. *Don't allow your self-image (self-esteem, self-efficacy) to be damaged by an unpleasant selection process.* Not every selection process is a healthy one, nor does everyone get an interview or a job. Do not let disappointment or frustration influence how you feel about yourself. There's simply not enough information to 'take it personally'. *Don't over-react or take personally time delays.* It is hard to wait for news about how you did during a job application but that's part of the process. Reacting emotionally doesn't do any good. And finally, *don't let a negative outcome such as not getting a job outweigh a positive experience.* If you managed to get an interview or if you learned more about an industry you'd be interested in working in at some future date, those are good things in themselves. While you may not have secured a job you were interested in, learning what you can from the experience and then 'moving on' is a healthy attitude which can serve you well.

FUTURE RESEARCH DIRECTIONS

As we have reviewed this literature, we've identified a number of areas for future research: The application of fairness heuristic theory and fairness theory to applicant reactions research; the systematic expansion of the applicant reactions field into the domain of promotions; and the

exploration of the dynamic nature of applicant reactions and dispositions. In this section, we summarize what we consider to be the biggest gaps in this literature, as well as some ideas for where the literature should go to stay relevant to the current selection context.

Address Issues Relevant to Current Hiring Practices

The primary applicant reactions models are now over 20 years old. That in itself is not a problem: Gilliland's (1993) model, for instance, is rooted in a strong theoretical base and does a good job of fixing selection concepts within organizational justice theory. However, the last 20 years have seen significant changes in the way selection practice is done, including the use of Internet testing and mobile technology. Moreover, organizations have far greater data available on applicants and can link it to additional data sources (e.g., social media), factors that were not considered when these applicant reactions models were developed. For example, some employers now use (or are considering the use of) applicants' social media pages for selection decisions. Although there are legal reasons why employers should be wary of such practices, there are also issues around how applicants perceive such practices. For example, Baysinger, Krauss, Truxillo, Bauer, and Rineer (2014) found that online applicants' privacy concerns (concern about how their data might be used or shared) at baseline had a significant effect on later applicant reactions – a far greater effect than other applicant concerns. In short, the applicant reactions literature is well prepared to shed light on the viability of many new selection practices and should move in this direction, as the concerns of societies and their citizens continue to evolve.

Employer Practices for Improving Reactions and Dispositions

The applicant reactions literature has determined that applicants prefer certain selection procedures to others. However, the procedures preferred by applicants are not always the most practical for organizations to use. For this reason, there has been research into explanations as an inexpensive way to improve applicant reactions (e.g., Truxillo et al., 2009). In addition to a need to examine a range of explanation types to understand which explanations are most effective and when, we see several other areas for future research on improving reactions. First, research has shown that respectful treatment during selection can affect later applicant reactions (e.g., Feys, Anseel & Wille, 2012). Future research should examine ways to improve such treatment by training HR professionals about how to treat applicants well. This includes ways to treat applicants as individuals despite large applicant pools. Some large organizations such as Google and Marriott continue to apply applicant reactions research findings in practical ways to help them treat applicants better despite the large numbers of applicants they see each year (McCarthy, 2013).

Second, researchers may want to consider how providing information to applicants (or to test-takers in general) can affect test performance and perhaps even test validity. Truxillo et al. (2009) found that explanations affected test-taking motivation, which in turn affected test performance. These findings suggest that explanations and other interventions (providing different instructions) may affect test-taker performance, which may have important implications for how to treat test-takers during test validation processes.

Stop Chasing Implausible Outcomes and Examine the Ones that Matter

One hope of early applicant reactions research was that such reactions might affect a number of post-hire outcomes such as performance. The effects on distal outcomes such as job performance appear to be somewhat limited (McCarthy et al., 2013). More important, though, the likelihood of reactions to a hiring procedure affecting outcomes like behavior later on the job seems a bit of a stretch, and the inability for applicant reactions research to ‘deliver’ on these promised outcomes has likely caused many researchers to dismiss the field entirely. However, we argue that such an approach is ‘throwing out the baby with the bathwater’. Rather, there are many viable outcomes of applicant reactions that need to be examined and that are at least as

relevant. First, as we’ve mentioned, applicant reactions to the promotion procedures have received relatively little examination, but the research thus far is promising (Ambrose & Cropanzano, 2003; Truxillo & Bauer, 1999). Internal candidates for promotion have far more investment than external candidates and do not simply go away once rejected; their reactions could be critical for organizational performance. Second, the effects of testing procedures on self-perceptions and even employee health and well-being has important implications for the person, the organization, and for society. In short, we should stop considering just the outcomes described in the original applicant reactions models and instead examine outcomes that are more likely to be affected by the selection context – and which are relevant to applicants, employers, and to society.

CONCLUSION

The field of applicant reactions began in earnest with a consideration of the fair treatment of applicants (Gilliland, 1993) but has since become quite broad, with a number of implications for selection practice. As we have identified in this chapter, a large literature has developed, examining many important, yet distinct, questions about applicants’ dispositions, experiences, and reactions to the hiring process. Despite these advances over the last 20 years, more work is needed to understand when applicant reactions matter, in terms of both organizational and individual outcomes. As a research field, applicant reactions has developed a strong theoretical footing and has important implications for the design of selection practices internationally. As the practice of selection has profoundly changed in recent years via the use of social media and so forth, and this change is set to continue in the coming years, our expectation is that applicant perspectives research will continue to have important practical consequences. For these reasons, the field of applicant reactions is poised for new advances. We look forward to this next wave of applicant reactions research and what it will bring.

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Training and Learning in Work Roles

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INTRODUCTION

Since the first edition of this *Handbook* was published in 2001, the nature of the training enterprise has changed significantly. It is no longer the case that the bulk of training for specific work roles takes place in a classroom at a specified time. Much of it is available online, or embedded in the work situation itself. It can occur virtually continually, and relies heavily on the trainee's own self-management, which sometimes includes seeking instruction from co-workers. Some authorities (e.g., Noe, Clarke, & Klein, 2014) assert that upwards of 80% of what we 'learn' at work is acquired informally on a more or less continuous basis. Such developments are often attributed to rapidly changing performance requirements in many work roles brought about by more rapidly changing work technologies, globalization, and the development of new product and service sectors that didn't exist at the start of the twenty-first century, as well as the availability of training technologies that did not exist 20 (or even 5 or 2) years ago. These dynamics will most likely be characteristic of the economy for many years to come. Also, we certainly acknowledge that all of us, for better or for worse, are learning 'things' virtually all day, every day; and that much of our informal learning is work-related (e.g., Conlon, 2004; Kitching,

2008). However, in all the discussions of informal learning, no evidence is offered concerning whether what we learn informally is the 'right stuff', or what learning content or learning strategies informal learning might include.

The message here is that the more things change, the more *some* things stay the same. Consequently, for the purposes of this chapter, training is still defined as a planned intervention, even if it is informal and self-managed, that is designed to enhance the *determinants* of individual work performance, whether the individual functions independently or as a member of a team. Individual work performance is conceptualized as in recent work on performance modeling (Campbell & Wiernik, 2015): That is, performance is defined as behaviors or actions that are judged relevant for the organization's goals, and that can be scaled in terms of the level of the individual's contribution they represent. Performance itself should not be confused with its determinants. For virtually any position, job, or occupation, performance is multidimensional and it is reasonable to think of the major performance factors as describing the critical dimensions along which an individual job holder should be trying to excel. The goal contribution requirement is critical. It focuses attention on the purposes to be served by work roles, and there could be multiple goals, or goal conflict, as

when considering the organization's goals versus the individual's goals.

Given a sample of job holders, inter-individual differences, as well as intra-individual differences, in performance are a function of multiple determinants. Campbell, McCloy, Oppler, and Sager (1993) and Borman and Motowidlo (1997) argue that it is useful to think of *direct* and *indirect* determinants, and that there are three kinds of direct, real-time performance determinants: current knowledge, current skill, and current volitional choice behavior (i.e., motivation), realizing that there are many different kinds of knowledge and skill and many variations in choice behavior. Consequently, performance on a particular performance factor can be improved only by enhancing real-time job-relevant knowledge, job-relevant skills, or developing more advantageous choice behavior (e.g., choosing to work on the appropriate things, choosing to expend more effort, or choosing to expend effort for a more sustained period of time).

Individual differences in each of the direct determinants are in turn a function of multiple indirect determinants, which are legion. A large class of such determinants are relatively stable traits that could represent cognitive, psychomotor, sensory, or physical abilities; or dispositions such as personality characteristics, values, interests, or motives. Such traits would generally not be regarded as 'trainable'. However, where there are traits there are also many kinds of 'state' variables that are either ability-centered (e.g., specific knowledge domains and/or specific skills) or disposition-centered (e.g., attitudes, self-efficacy, goals). State variables might generally be regarded as trainable. Both trait and state determinants can have complex interactions with the context (e.g., reward systems, climate) that governs their effect on real-time knowledge, skill, and choice behavior.

A schematic (not a 'model') of all this is shown in Figure 19.1, which also makes the distinction between performance itself and the outcomes of performance. The bottom line is that training and instruction are focused on the determinants (direct or indirect) of performance, not performance itself, and only a subset of indirect performance determinants would be responsive to instruction, regardless of whether it is formal, informal, or self-managed.

A similar explication applies to team training, and team performance must also be distinguished from its determinants. Obviously there are different types of teams, including the traditional work group, action teams (e.g., sports teams, medical teams, military units), crews associated with operating particular equipment, management teams, and the very autonomous, highly cross-trained,

and self-managed high performance work team (Guzzo & Shea, 1992). There is nothing necessarily mysterious about teamwork or team self-management. It is simply that the determinants of team performance that are responsive to a training intervention may also involve inter-individual interactive effects among the knowledge, skills, and choice behaviors of its members, as well as individual levels of knowledge, skill, and choice. The question of how to enhance both the individual effects and the interactive effects via training is the team training issue.

As defined above, this chapter will be limited to learning-based interventions that are, in some sense, systematically designed to enhance particular performance determinants, including designs and interventions that result from self-managed instruction that is 'informal'. Consequently, other important learning-based experiences such as the organizational socialization process will not be discussed, even though many of the principles of training design apply to these experiences as well.

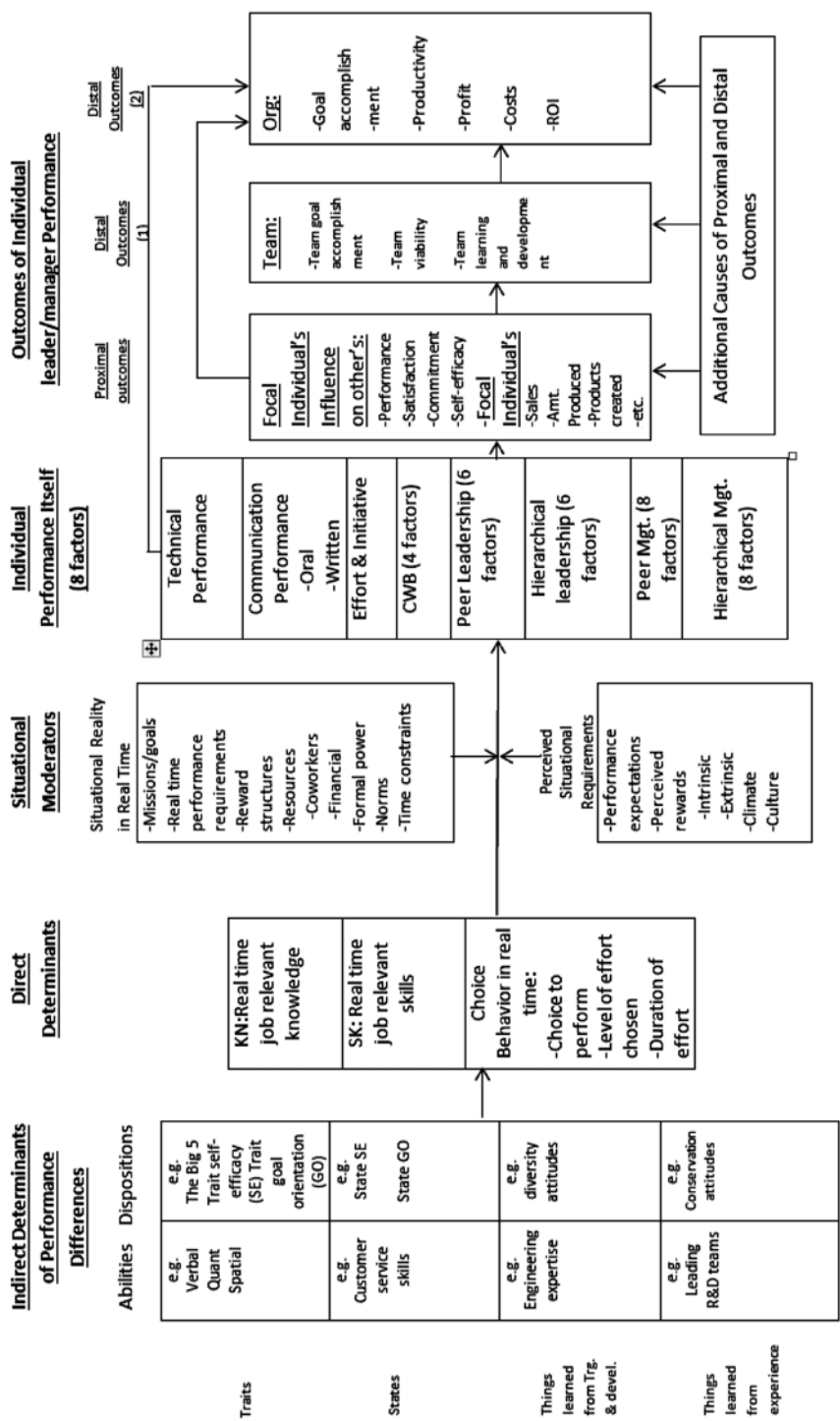
OBJECTIVES

The objectives of this chapter are to: (1) review and discuss the major issues pertaining to: how individuals actually 'learn'; the design of training for individuals and teams; the instructional conditions that influence training effects; the interactive effects of learner individual differences with alternative instructional programs; the role of motivation; and the problem of transfer of training; (2) summarize the research literature on the evaluation of training effects; and (3) summarize the literature on the identification of specific critical training needs. That is, what are the most important substantive training needs that have broad relevance for the world of work?

The information reviewed comes from theory, research, and practice and we will try to identify implications for all three as we go along. Also, we will try to be as jargon free as possible, in an attempt to make the chapter accessible to as wide a variety of audiences as possible.

FOUR MAJOR ISSUES

Four major issues underlie any attempt to design or implement training, evaluate its effects, develop training theory, or conduct R&D type research on training questions. They are: (1) the



*See Campbell(2012) for an explanation of the factors.

Figure 19.1 A schematic of the causal sequence progressing from indirect performance determinants to the direct determinants (i.e., the mediators of the indirect determinant effects) to individual performance itself, as moderated by situational effects. The proximal and distal outcomes have other 'causes', in addition to the focal individual's performance. The additional causes may have major or minor effects

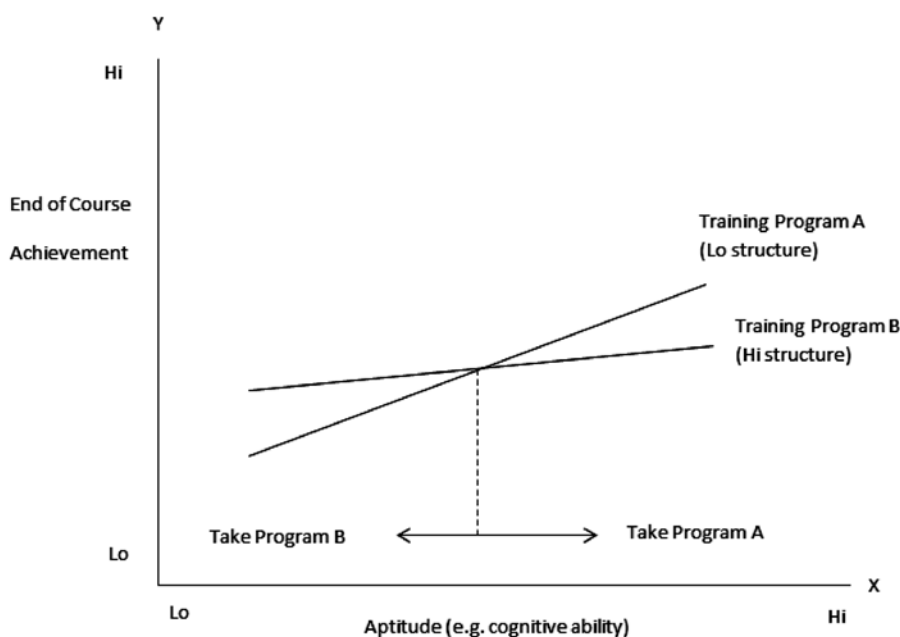


Figure 19.2 An example of an aptitude-treatment interaction (ATI). The regression of course/program achievement on individual cognitive ability, for two different training programs (A and B), assuming random assignment of trainees to either the structured training program (B) or the unstructured program (A)

universality of the aptitude-treatment interaction; (2) the ubiquitous criterion problem; (3) the nature of the learning process itself; and (4) the overall model of training design that guides design, implementation, and evaluation.

The Aptitude-Treatment Interaction (ATI)

Cronbach (1957) and Cronbach and Snow (1977) made the ATI a virtual icon for research on training and instruction. The principal message is that all trainees are not alike and some of the characteristics on which people differ are correlated with training achievement. That is, even though everyone is given the same training experience (i.e., the 'treatment'), some people will do better than others as a function of having more or less of the 'aptitude' (e.g., cognitive ability, need for achievement, anxiety, self-efficacy, level of previously acquired knowledge and skill, level of interest in the material, etc.). Further, the magnitude, and perhaps even the direction, of the correlation may differ across samples that receive different treatments (i.e., instructional programs). The ATI of

most interest is the case where X (the aptitude) and Y (the criterion variable) are measured in the same way in each treatment group and the regression lines cross, as in Figure 19.2.

The major implication is that to maximize aggregate gain across all trainees, the same training program should not be given to everyone. Ideally, trainees should be 'assigned' to programs based on the program for which their predicted end-of-training score is highest. This problem is formally equivalent to personnel placement and classification (when jobs or job levels are treatments) and to the assignment problem in linear programming (e.g., when different locations or routes are treatments). Cronbach and Gleser (1965) showed that, if the correlations across treatments are different, then the gain in aggregate achievement grows exponentially with the number of treatments, so long as the regression lines intersect. It is a potentially powerful phenomenon, but is obviously constrained by the differential validity of the aptitude information. The most extreme case would be to provide a different training experience for each individual. Some are of the opinion that advances in instructional technology already make this possible. It could very well be in the form of multimedia intelligent tutoring systems (virtual

reality included) which could customize the training experience down to 'virtually' the optimal level, and at a reasonable price (e.g., see Shute & Towle, 2003). Again, the constraints would be the differential validity of the potential aptitude information for predicting achievement in different learning programs, and the extent to which all the major parameters along which instruction can usefully vary are known.

Cronbach's presidential address to the American Psychological Association in 1956 pointing to the potential power of the ATI (Cronbach, 1957) filled the instructional world with hope, and many attempts were made to find useful ATIs, primarily in education (Cronbach & Snow, 1977; Snow, 1989; Snow & Lohman, 1984). Historically, two ATIs have been found with some consistency, but almost entirely in educational settings. The most frequent has been the interaction of general cognitive ability and the 'structure' of the instructional program when more structure means more instructor guidance, more detailed objectives for the learner, more explicit specifications for the content to be taught, and more frequent feedback (Snow, 1989). High ability people do better with low structure and vice versa for low ability individuals, although the variance accounted for by the interaction has not been large. The second ATI is represented by the interaction of trainee anxiety or self-efficacy and the degree of program structure. High anxiety and low self-efficacy individuals tend to do better in more structured programs. We can now take a much more sophisticated view of program 'structure', and will do so in later sections. For example, Gully et al. (2002) show an interaction between 'error-encouragement' training versus 'error-avoidance' training and both general cognitive ability and the openness to experience factor from the Big Five.

During the last 20 years there has been a modest increase in research on ATIs in organizational settings, which is reviewed by Gully & Chen (2010). The 'aptitudes' now have much more to do with motivation and attitude differences. However, as we noted some time ago (Campbell, 1988; Campbell & Kuncel, 2001), the potentially powerful interactions of pre-training individual differences in knowledge and skill with differences in instructional content and instructional methods is still given scant attention in organizational training. It still tends to be one size fits all with little regard for differences in the initial state of the learner's knowledge, skill, or characteristic choice behavior. For example, interpersonal skills training using behavioral modeling techniques is not tailored to the trainee's initial level of interpersonal skill. A still reasonable hope is that current and future research on occupational training will change this situation. The potential power of

using pre-training knowledge and skill as the aptitude is illustrated in studies by Ackerman (2007), Kalyuga and Renkl (2010), and Maki and Maki (2002). A meta-analysis of ATI studies in educational settings that use pre-training knowledge and skill as the aptitude is reported by Whitener (1989).

The Criterion (Dependent Variable) Problem

Training is implemented for certain purposes, however appropriate or inappropriate they might be, or from whatever theoretical perspective they might come. This begs the question of the extent to which the program did, or did not, accomplish its purposes; and if not, why not. Consequently, the need for the assessment of training effects is a major issue, regardless of cultural differences, national economic system differences, industry sector differences, one's preferred instructional theory, or whether the training is self-designed or organization designed. Following the definition of training being used here, the proximal objectives of training are to increase performance-relevant knowledge, increase performance-relevant skill, or enhance the antecedents of individual performance-relevant choice behavior. The criterion issue concerns whether the intended changes were accomplished, and to what extent. This is true regardless of whether the desired changes are defined by the organization, the individual, or via collaboration between the two.

However, Dipboye (1997) and Salas, Cannon-Bowers, Rhodenizer, and Bowers (1999) have pointed out that organizations (and individuals) can have other purposes for training as well. For example, training can serve a number of symbolic functions. Organizations can use it to show various audiences that they are concerned about supporting skill improvement among their employees, or appropriately managing a diverse workforce, or preventing sexual harassment, or improving supervision and management. Individuals can use training certificates, educational degrees, or even graduate degrees as symbols of accomplishment and status. Both organizations and individuals may use training certification as a way to avoid or aid litigation, as in establishing 'expert' credentials, or for meeting the terms of an out-of-court settlement by conducting certain types of training (e.g., for reducing sexual harassment). While none of those purposes are necessarily inappropriate and may serve individuals or organizations well, they are not our concern here, except as they might interfere with designing training to improve performance-relevant knowledge, skill, or choice behavior.

Historically, the framework most often used to think about the training criterion problem is the Kirkpatrick (1959, 1996) classification of possible criterion measures into four types: (1) *reactions*, or trainee self-reports of training effectiveness; (2) *learning*, or independent end-of-training measures of knowledge, skill, or attitudinal change; (3) *behavior*, or measures of performance back in the job setting (i.e., the transfer issue); and (4) *results*, an assessment of improvements in organizational outcomes that have direct implications for the 'business purpose' and the organization's viability. Unfortunately, these four 'types' have never been all that well-specified (Alliger, Tannenbaum, Bennett, Traver, & Shotland, 1997). For example, *reactions* may refer to global judgments of how much the individual liked the program, to specific opinions about the relevance (aka utility) of the content or the usefulness of the training methods, or to judgments about how much individuals think they have learned. Sitzmann et al. (2008) argued, on the basis of a meta-analysis, that post-training self-efficacy has a much stronger correlation with post-training achievement than do trainee reactions, although the unmeasured variable effects of cognitive ability and pre-training self-efficacy are not accounted for. *Learning* may refer only to knowledge acquisition, or it may also refer to mastery of demonstrable skills or changes in measured attitudes. It is also not clear whether *behavior* refers to assessment of the same variables specified by the learning criteria, except that they are assessed in the job setting, or to the use of what has been learned across a variety of job situations (i.e., transfer), or whether it refers to the assessment of job performance itself, not its determinants.

As noted by many observers (e.g., Alliger et al., 1997; Ford, Kraiger, & Merritt, 2010; Salas & Cannon-Bowers, 2001; Salas et al., 1999), there has not been much research directed at modeling training achievement itself. Certainly it has not kept pace with recent research and theory on the nature of job performance (Campbell & Wiernik, 2015). One clear finding is that global trainee reactions are not correlated with learning or mastery, or with much of anything else for that matter. Similar results from educational settings (Greenwald, 1997; McKeachie, 1997) call into question the indiscriminate use of student/trainee self-evaluations for various purposes. A recent meta-analysis by Sitzmann et al. (2010) suggests strongly that student/trainee self-assessments of how much they have learned lack construct validity. Such assessments are more likely indicators of trainee satisfaction.

What Kirkpatrick refers to as *learning* is really the core concern of training. It refers to whether or not the trainees learned what they were supposed to have learned, which implies there were explicit training objectives (that were well chosen). A measure of

learning is not a surrogate for overall performance in the job setting or for indices of unit or organizational effectiveness (i.e., 'results'). Learning goals can be stated in terms of changes in knowledge, skill, choice behavior, or attitudes (or cognitions, skills, and affect if you prefer, as in Kraiger, Ford, & Salas, 1993), but no one training program can include all the determinants of individual job performance (some are not amenable to training), and bottom-line or results indices can have multiple determinants, in addition to the performance of individuals.

There is considerable discussion in the practitioner literature about the need to link training activities to results, such as the return on investment (ROI) for training costs (e.g., Parry, 1996; Phillips, 2003; Purcell, 2000). In every published discussion of this issue to date, the difficulty of controlling for alternative explanations is largely ignored, and obtaining a valid metric for both costs and benefits is made to sound much too easy (Bersin, 2008). For some training interventions the link between achieving the objectives and improving organizational outcomes could be relatively straightforward. For most, it probably is not, and involves considerable scaling of the benefit side via expert judgment. For a balanced view see Russ-Eft and Preskill (2005).

This is *not* an argument that the totality of individual performance or bottom-line indicators of organizational effectiveness, including ROI, are not important. They obviously are. In the end, from the organization's perspective, training must contribute to the organization's goals, which may or may not be stated in strictly financial terms (Swanson, 2005). A much broader view of training evaluation is presented by Sitzmann and Weinhardt (2015) who discuss training evaluation for multiple purposes, including diagnosis of individual instructional problems, minimizing program attrition, and maximizing contributions to organizational goals. Their full systems view goes beyond the concerns of this chapter, but should be required reading for everyone interested in the contributions of training to organizational performance. For our purposes, whether a training program meets its objectives, whether the objectives reflect important determinants of performance, and whether what is learned in training is actually used in the work setting are the important initial questions. The linkage between competencies to be learned in training and job performance itself is established by an appropriate needs analysis. A fourth question is whether the performance of individuals and teams constitute causal determinants of differences in organizational effectiveness. A meta-analysis by Crook et al. (2011), and an extensive analysis of pre and post 'Great Recession' data by Kim and Ployhart (2014) suggest strongly that they do.

Additional affirmative evidence is presented by Park and Jacobs (2011), Saks and Burke-Smalley (2014) and Tharenou, Saks, and Moore (2007). Aguinis and Kraiger (2009) go further and review the evidence that training activities have an impact on national economies, via their impact on both individual and organizational functioning. They certainly seem to. Based on all such evidence, training is indeed an important investment.

For a specific organization, the most reasonable view (again, some would call it a 'systems' view) of these issues is first that the bottom line, or results, indicators must be construct valid measures of organizational effectiveness, which in the beginning assumes some basic agreement among the stakeholders about the nature of the organization's goals. In their review paper, Ployhart and Hale (2014) point to three types of organizational effectiveness components: operational performance, organizational performance, and between organizations competitive advantage. Ideally there should be a causal sequence between training achievement and all three. That is, the prescribed performance roles for individuals and teams, however broad or narrow they are, must be valid determinants of organizational effectiveness; realizing that there are other determinants of organizational effectiveness as well. This is a matter for organization, team, and job (i.e., systems) design. If individual work roles or teams are not designed to contribute to the organization's goals, by mistake or by default, then they most likely will not, no matter how well trained they are. Again, the fundamental question for this chapter is whether the objectives of training address important and valid determinants of individual or team performance given the assumption that individual and team performance contribute to the accomplishment of the organization's goals. Once these questions are answered, *then* we can usefully go on to ask whether a particular training program meets its objectives; and if not, why not. In addition, Bjork (2009) reminds us that demonstrating learning at the end of training is secondary to being able to retain what was learned and use it in a transfer setting, as discussed in a later section. Certain features of training design (e.g., certain kinds of practice and feedback) that facilitate long-term retention may do so at the expense of proficiency during training, which is just fine. Retention and transfer are what we want.

How Do People Learn?

Learning is the process through which training interventions produce value. In line with previous authors, we define learning as a 'relatively'

permanent change in knowledge, skills, attitudes, or beliefs (cf. Halpern & Hakel, 2003). Due to the central role that learning plays in the training enterprise, a specification of the learning process itself is the foundation for all other aspects of training design.

The learning process may be considered at multiple levels of analysis ranging from the neurological to the organizational (i.e., the learning organization). However, while explanations of learning from the cognitive neuroscience literature are certainly of interest (cf. Fell & Axmacher, 2011), and theories from this domain may produce important insights for training design in the future, a perspective at the level of the individual seems most helpful for the purposes of this chapter. Accordingly, the cognitive psychology, educational psychology, human factors and I/O psychology literatures seem most relevant for developing a description of the learning process.

Historically, cognitive psychology has identified attention, short-term (aka working) memory, and long-term memory as the most relevant components of the learning process (cf. Baddeley, 2012). Although recent theories have emphasized the interrelated nature of these phenomena at both a psychological (Cowan, 2001, 2008; Oberauer, 2009) and neurological level (Jonides et al., 2008; LaRocque, Lewis-Peacock, & Postle, 2014), we think the historical perspective still provides a useful framework, as do many others (e.g., Paas, van Gog, & Sweller, 2010). Within this framework (i.e., cognitive architecture), the learning process can be conceptualized as a series of stages leading from initially attending to instructional materials to the later recall of these materials from long-term memory, and each stage of the process represents an opportunity for the training intervention to either facilitate or hinder learning. Consider each stage in turn.

Learning instructional content must, of necessity, begin with attending to the content. Consequently, it is incumbent upon the training intervention, self-directed or organization directed, to take steps to ensure that trainees devote attention to the relevant training content and minimize off-task cognitions (cf. Kanfer & Ackerman, 1989). Failure to succeed at this stage threatens the success of the training experience, and its success should not be left to chance. Fortunately, a large body of literature has developed to explain the antecedents of trainee 'motivation to learn', i.e., the willingness to direct attention to the learning content, to expend high levels of effort engaging with the relevant content, and to persist in the face of difficulties (Colquitt, LePine, & Noe, 2000; Latham, 2012; Schmidt et al., 2012). Key findings from this body of research will be discussed in a later section.

Assuming that instructional materials have been attended to, the next step entails how they are perceived and encoded into the working memory (WM) system. The mental processing engaged in by the trainee, following presentation of training stimuli, is the proximal determinant of learning outcomes. A major goal of training design is to provide an environment where appropriate processing can take place. For example, the presentation of the same instructional stimuli may result in very different perceptions of meaning (i.e., encoding by trainees), depending upon: (a) the trainees' interpretations of the stimuli's conceptual meaning; (b) the perceived interrelationships of the training content with other concepts; and (c) the perceived significance of the training content for solving problems encountered in the workplace. Trainees will only retain information as it has been processed through the prism of these interpretations. These interpretations, in turn, are in large part determined by the trainee's base of prior knowledge, faulty, sparse, or 'biased' though it might be (Bransford, Brown, & Cocking, 2000), and by the elements of the training design that influence the learner to perceive information in the most useful way. It is also the case that WM is of limited capacity and efficient encoding of perceived material is a critical requirement for effective learning. Experts, distinguished by their possession of a large body of high quality tightly integrated domain-specific knowledge, are able to impart meaning to newly presented materials by reference to their existing mental models of the domain (Bransford et al., 2000; Kalyuga, 2011). The ability to integrate new materials into existing mental models results in a greater understanding of the presented materials, which facilitates retention and transfer to the job environment (Bransford et al., 2000). In contrast to experts, novices lack an organized base of existing knowledge that could be used to provide context to newly learned materials and increase the efficiency of the learning process. It is the responsibility of the training design to provide this context, and improve the efficiency of WM, by creating an environment where trainees are helped to encode and structure the training content in a useful way and to understand the implications that mastery of the content has for performance in the job environment (e.g., relevance to commonly encountered problems). Although the creation of such schematic knowledge, skill, or attitude structures may not be required for all job tasks (e.g., sometimes, it really *is* enough just to know where to find the fire extinguisher), for more complex tasks the development of sophisticated mental models may increase a trainee's ability to adapt knowledge to solve problems encountered once back on the job. Enabling such behavior is the ultimate goal of the

training enterprise, and it must take the trainee's pre-training levels of knowledge and skill into account.

At this point, a trainee has attended to instructional materials and developed (for better or worse) a subjective interpretation of these materials. Whether or not the information present in working memory is transferred to, and recoverable from, long-term memory depends upon the manner in which it is processed. A large body of evidence from cognitive neuroscience, cognitive psychology, and applied psychology converges to suggest that it is 'active' processing directed toward the learning goal that results in the construction and impartation of conceptual meaning to instructional content and facilitates later retention (e.g., Craik, 2002; de Winstanley & Bjork, 2002; Dunlosky et al., 2013; Heimbeck et al., 2003). The key question for training design is *how* to elicit this type of processing. *Pure* discovery learning, in which trainees are allowed to navigate a learning environment as they choose and create meaning for themselves without guidance, has been shown repeatedly to be a poor instructional strategy (Kirschner, Sweller, & Clark, 2006; Mayer, 2004; Tobias & Duffy, 2009). The goal of training design should be to provide a learning environment that pushes trainees to actively process information, by using appropriate training methods, while still providing sufficient structure to ensure that the information processed is goal-relevant (Mayer, 2004). The impetus for active processing may come from at least two major sources. In the first, trainees could be highly motivated to learn and put forth a great deal of effort on their own toward attaining an understanding of the course material. The instructional design role is then simply to guide this effort. Second, active processing may be built into the training methods, as by requiring trainees to answer questions, work through examples, practice a skill, make decisions, produce explanations, or solve problems (cf. Dunlosky et al., 2013). Trainees should only be guided to expend cognitive effort within the context of learning materials that they are capable of mastering (Kalyuga, 2011). However, where this capability exists, increased cognitive effort will facilitate storage and retention in long-term memory.

An additional consideration relevant to the long-term retention of information is the role of affective states at the time of instruction. Emotional valence, both positive and negative, has been linked to improved memory of events (Kensinger, 2009). This suggests that the induction of positive emotions in trainees may be conducive to the retention of information. Nonetheless, the ultimate goal of a training intervention is the impartation of knowledge and skill, or attitude change, not

Table 19.1 A taxonomy of capabilities that are potentially trainable

<i>A. Increases in knowledge</i>	
1.	Knowledge of labels and facts pertaining to objects, events, processes, conditions, etc.
2.	Knowledge of plans and goals.
3.	Knowledge of facts concerning if/then relationships, or how A relates to B. (A fundamental basis for expertise.)
4.	Knowledge of rules or procedures for accomplishing specific goals or objectives relative to cognitive, social, or physical behavior. Often referred to as proceduralized knowledge.
5.	Self-knowledge (e.g., are you introverted, conscientious, respectful of others).
<i>B. Increases in observable skills:</i> A skill is defined as the application of knowledge capabilities to solve structured problems or accomplish a specified goal. That is, for structured problems, there are known solutions and known ways of achieving them. The issue is whether the individual can actually apply the knowledge capabilities and achieve the solution or goal. Some important skill domains are:	
1.	Cognitive skills (e.g., multivariate statistical analysis).
2.	Psychomotor skills (e.g., keyboard use, surgical skills).
3.	Physical skills (e.g., carrying fire victims to safety).
4.	Interpersonal skills (e.g., accepting critical feedback from others).
5.	Expressive skills (e.g., speaking, singing).
6.	Self-management/self-regulation/metacognitive skills (e.g., choosing goals, reflecting on strategies, monitoring your own performance).
<i>C. Increases in problem solving capability:</i> Specified as the application of knowledge and skill capabilities to ill-structured problems. Ill-structured problems are defined as problems that do not have a pre-specified solution and the exact methods for obtaining a solution also cannot be specified. Some examples would be: developing proposals for new research, or evaluating a new production control system for potential glitches.	
<i>D. Changes in attitudes and beliefs; for example</i>	
1.	Self-efficacy
2.	Organizational commitment
3.	Racial attitudes
4.	Sexist beliefs
5.	Cultural tolerance.

entertainment. If attempts to elicit positive emotion interfere with the transmission of needed knowledge and skills (as when fun, out of the box, training modules replace interventions developed from appropriate needs analysis), it is counterproductive. For long-term retention, it pays to laugh – but only at the right time.

Having encoded information into long-term memory, what remains is the storage, retention, reorganization, and utilization of this knowledge at a future time. Before proceeding to a discussion of these dynamics, however, we would like to draw attention to the fundamental distinction between knowledge and skill (see also Table 19.1). The distinction can be summarized succinctly in that knowing how something should be done is not the same as actually *being able* to do it, particularly with regard to physical, psychomotor, or social skills. Practice at producing desired behaviors is essential for this transition to occur. Importantly, skill acquisition via practice will occur at some point in trainees' learning processes regardless of whether this practice occurs during the course of the training program, or after. The training

intervention must consider whether allowing for practice during the course of training is necessary, or whether trainees can be safely entrusted to correctly apply and practice learned procedures in the workplace without trained supervision, as may be the case for very simple skills.

Once in long-term memory, information does not remain in a static state. Two key concerns for the training practitioner are the retention of information over time and the reorganization and adaptation of materials in response to changing workplace demands. Bjork and Bjork's (1992) theory of disuse provides a conceptual framework within which to consider the antecedents of retention. The core assertions are simply that long-term memory is dynamic, and that any item stored in long-term memory can be characterized by its *storage strength* and retrieval strength. Storage strength reflects true learning, and is increased by appropriate practice in skill execution or information recall. Retrieval strength reflects the accessibility of an item at a given moment and can decrease rapidly following cessation of practice if items are newly learned. However, with repeated practice, storage

strength increases and the loss of retrieval strength following cessation of practice slows. This is especially true when practice events are spaced widely apart (Arthur et al., 2010), and require effortful processing. Appropriate practice is a potent force for aiding long-term retention (cf. Roediger & Butler, 2011). Practice, as a condition for learning, is discussed in more detail in a later section.

At this point, if all has gone well, trainees will possess, in long-term memory (LTM), a body of knowledge and skill that has been retained over time and which can be applied to meet demands of later performance requirements. Additional critical considerations include the antecedents of trainee decisions to transfer learned skills onto the job, as well as the means by which trainees can use their existing base of knowledge and skill to meet novel workplace demands. Their issues will be discussed at greater length in a following section, but a key variable underpinning successful transfer is the depth and cognitive structure of a trainee's knowledge and skill domain (Salas & Rosen, 2010). When trainees possess a well-integrated body of prior knowledge and are able to abstract general (yet domain-specific) problem solving strategies from this knowledge, these strategies may be applied to successfully meet the demands of novel tasks (Bransford et al., 2000).

In sum, the learning process consists of: (1) attending to the appropriate instructional material, (2) perceiving (i.e., encoding) the material appropriately, (3) capturing it in WM in the appropriate structural form and (4) moving it to LTM via the appropriate cognitive effort, where it is subjected to intermittent additional practice, recall, and re-structuring. The key to capturing the appropriate perceptions in WM and transferring them to LTM is effortful processing. That is, given that the effort is germane to the learning goals and the learner is capable of producing the responses, the more one must cognitively or physically 'produce' the responses to be learned, under a variety of relevant conditions, the better. Learning is work, which some may enjoy, but some may not. A variety of such conditions are discussed in later sections of this chapter. However, this basic learning process itself is the same for everyone Brown, Roediger, & McDaniel, 2014). It does not matter whether instruction is designed by the organization, or is self-managed. The learning process is the same. Parenthetically, there are no such things as individual learning 'styles' (Paschler et al., 2008).

Alternative Models of Training Design

By training design we mean a plan, or 'blueprint', for deciding what should be learned during a training experience, how it should be taught, and what

conditions should be created to facilitate learning and mastery. There has always been considerable healthy controversy over what designs are most useful regardless of whether the focus is the K-12 public school system, post-secondary training, university education, training in the military, or occupational training in all its various forms. Most discussions of alternative 'models' for training design begin with pointed criticism of either the 'traditional approach' (McGehee & Thayer, 1961) or the Instructional Systems Development (ISD) model (Vineberg & Joyner, 1980).

The traditional approach

The traditional approach is said to view the training function as a narrowly constrained micro enterprise that focuses only on the individual trainee as a unit of analysis and only on individual end-of-course performance as the criterion of interest. It does not view the training function as a subsystem within a larger and very complex organizational system, which it obviously is (Kozlowski & Salas, 1997; Noe, 1999). However, it is possible to take two different views of this issue, the institutional versus individual (Cronbach & Gleser, 1965). The critics of the traditional approach take the organizational point of view, within which the justification for training is that it makes important contributions to individual and team performance which in turn contribute to the organizational goals. That is, the training function is a subsystem that serves the organization's goals, and should be designed and evaluated accordingly. The more important the training goals and the better the training design the greater its contribution. However, the training contribution can also interact, for better or for worse, with other HR strategies and features of the context (e.g., selection, culture, and climate). Both the main effect and the interactions must be studied. The individual point of view can be different in the sense that individuals might want to improve certain skills because it will make their job easier, increase their chances for a promotion, or better qualify them for a job in another organization, which might be what they really want. Consequently there could be two systems in operation here, the organizational and the individual, both at the same time.

Instructional systems development (ISD)

Instructional Systems Development, which grew out of the earlier work of Gagné (1962), Gagné and Briggs (1979), and Glaser (1976), has had its most intense applications in the military services (Vineberg & Joyner, 1980). In its worst light, it is described as based on overly detailed task and needs analyses, specification of a large number of

very narrow and specific training objectives that compulsively follow a certain format, and rigid prescriptions for training content. Presumably this presents a very structured experience for the trainee who is viewed as a passive recipient. According to the critics (e.g., Bell & Kozlowski, 2008; Gordon & Zemke, 2000; Noe et al., 2014), ISD is counterproductive in today's world because (1) it is too slow and bogs down the design process in almost endless detailed prescriptions; (2) it is not a true science-based technology and cannot make unambiguous substantive prescriptions for how training should be designed, it is simply a long detailed set of procedural steps to follow; (3) it concentrates on procedural checklists, loses sight of the original business purpose (i.e., the critical training needs to be met), and is geared to developing routine expertise and fostering direct transfer to job tasks that are similar to the training content; and (4) the ISD world view is that the training designer is all knowing while the trainee is resourceless and needs to be guided every step of the way. This flies in the face of the obvious fact that many trainees are very resourceful and manage their own learning quite well.

There is probably some truth and much caricature represented in these criticisms. The caricature is essentially rejected by Gagné et al. (2005) and by a number of prominent researchers in instructional and educational psychology (Clark, 2009; Kirschner et al., 2006; Mayer, 2004; Rosenshine, 2009) who argue that learning goals are necessary, there must be an explicit training design, and learning must be guided. The caricature exists only as bad practice. That is, in its uncaricatured form, ISD is a very useful and powerful model. However, over the past 15–25 years, the most recognizable and thoughtful alternative positions regarding training design seem to be the following.

Design by participation

This model argues that the most effective training designs result from the full participation of trainers and trainees on questions of specifying training needs and objectives, designing course content, and choosing instructional methods. Argyris (1992) was the primary advocate of this position which he called double loop learning. Participation should lead to higher trainee motivation, more relevant specifications of training needs, and more relevant training content. Traditional models and ISD are simply too authoritarian or 'theory X'. Participation as a model of training design is also advocated by Wlodkowski (1985), Knowles (1984), and Kraiger (2008). However, Baldwin and Magjuka (1997) argue, on the basis of their own review, that the available evidence simply does not support the central tenets of the participation model. That is, it

does not consistently lead to higher achievement of more relevant training goals; and participation may even create expectations that cannot be met. That said, potential trainees could be a valuable source of information about training needs, and the kinds of training experiences that would be motivating.

Self-managed instruction

Many of the criticisms of ISD in the organizational training literature assert that most individuals are highly motivated to improve their skills and will seek training opportunities to do so virtually on a continuous basis (Carroll, 1997). That is, given half a chance, people will design their own training experiences to meet their needs. Consequently, the responsibility of the organizational training system is to provide resources for people to use, as well as to provide opportunities for organizational members to share experiences about how they are trying to meet their training and development needs. Relying on individuals to shape their own training experiences is in part driven by the perception that organizations and jobs are changing so fast that procedures that depend on stability and continuity in jobs are not appropriate.

There is now a relatively large literature on the self-regulation and goal-directed behavior (e.g., Kanfer, Chen, & Pritchard, 2008; Latham, 2012; Schmidt et al., 2012) which in essence says that for self-managed instruction to pay off, the individual must be skilled at self-regulation. That is, they must be explicit about the goals they want to pursue, seek out or experiment with different training strategies for achieving them, monitor their own performance and seek feedback as learning progresses, forthrightly evaluate how they are doing, and change goals or strategies as need be. The jargon term for continually thinking about one's own self-regulation activities and how they should be altered or continued is *metacognition*. One strong implication of the self-regulation literature is that *everyone* should be taught effective self-regulation and metacognitive skills.

Constructivism

A somewhat similar position is reflected in educational theory by the constructivist perspective (Forman & Pufall, 1988; Fosnot, 1996; Jonassen, 2004; Spiro & DeSchraver, 2009). Constructivism, sometimes referred to as *discovery* learning, is modeled on the theoretical work of Piaget (Rieber, 1992) and asserts that learning benefits most when the students or trainees are given information, or placed in a situation, that stimulates their curiosity about why certain things happened in the past, how things work currently, or what will happen in the future. Mastery results from the student's

subsequent exploration and attempts to construct descriptions or explanations of events, and to develop responses (i.e., skills, strategies) that solve the problems about which they are curious. For example, a computerized simulation representing certain technical problems could be used to provide opportunities for the trainee to explore the nature of the problem, hypothesize possible solutions, and evaluate possible solution strategies. It is the active construction of descriptions, explanations, and skilled responses that promote learning. Mayer (2004) and Kirschner et al. (2006) take issue with the efficacy of constructivism and discovery learning and cite evidence from educational research that it produces less achievement overall than do more structured and guided approaches.

A thorough airing of these issues is presented in Tobias and Duffy (2009). Well-known representatives from both the constructivist and directed learning (similar to ISD) side presented their case, and then asked each other questions and responded to questions. Both sides (implicitly at least) acknowledged the need for explicit learning goals, and the need for requiring cognitive effort that is directly focused on the training objectives. The principal differences pertain to the amount, and kind, of learner guidance that is optimal, and the setting in which learning should take place. From the constructivist view the content to be mastered should be engaged in the actual setting in which it will be used (i.e., situated learning), and the degree of guidance provided by the instructional program should be no more than is required to keep the learner from wallowing in random effort or learning the wrong things. The directed learning advocates want to minimize the inefficiencies in discovering the right things and minimize the probability of learning something that is incorrect. Shorn of their rhetoric, the two camps are not far apart, particularly when the goal is to teach something called 'ill-structured problem solving' (e.g., see Bell & Kozlowski, 2002; Schmidt et al., 2007). Overall, the differences seem more 'theoretical', or semantic, than operational (e.g., see McGuire & Gubbins, 2010). Two interactive effects which the two sides acknowledge only fleetingly are that: (1) the need for situated instruction could vary depending on the training objective and (2) the level of guidance that is optimal depends on the trainees' current level of expertise.

Active learning

Related to the constructivist model is the *active learning* perspective described by Bell and Kozlowski (2008, 2010). Active learning is learner-centered and relies heavily on the trainees' own self-management of the learning goals to pursue, the instructional activities to use, the

monitoring of progress, and the providing of self-feedback. The instructional methods should promote self-exploration of the material to be learned, which in turn should facilitate greater cognitive learning, heightened intrinsic motivation and self-efficacy, and less state anxiety. It is not perfectly clear from the discussion of active learning how much, and what kind of guidance should be provided by external sources or whether the self-paced and help-menu features of internet-based training qualify as active learning.

One issue that is not discussed very much in the constructivism, discovery, and active learning literatures is whether discovery, and active learning methods have significant interactions with learner individual differences (e.g., the trainees' current level of expertise). That is, are they simply advantageous for everyone, or do some people benefit more than others. Also, where do the training objectives come from? Are discovery and active learning appropriate for all training objectives, or just a subset? We will return to these issues in the following sections.

There is another domain of literature that carries the 'active learning' label. It is large enough to have been reviewed several times. Perhaps the most recent review is offered by Cho and Egan (2009). In this literature, the term *action learning* refers to a method for individual or organizational development. In general, the method entails learning on the job as you confront new issues or problems in your work role. It is a form of on the job training, that can be given various kinds of structure. However it is described in quite esoteric language. We will discuss on the job training a bit more in a later section.

UNIVERSALS IN TRAINING DESIGN

We would like to argue that there are certain universals in training design that are impervious to national or cultural differences as well as to the current controversies over alternative models of training design. The list of universals simply identifies a number of issues that must be considered and a set of decisions that must be made before a training program design is completed. Yes, it is a 'list', but a very important list. A fundamental point is that even if these questions and decisions are not considered explicitly, or are aggressively rejected as irrelevant, they will still be answered by default, *always*; and could be inferred after-the-fact from what was actually done. That is, once the 'course' starts and is completed, all of the following questions will have been answered, one

way or the other. This is as true for self-managed, or informal, training as it is for organizationally managed training. The issues are truly universal.

We still believe that Gagné (1962) was very right when he argued that the most fundamental design issue is the specification of what is to be learned. What new knowledge, skills, beliefs, attitudes, or choice behaviors should the individual exhibit after training that they could not, or would not, exhibit before. In our terminology this is the specification of the *training program* objectives. Every training intervention will have them, whether the intervention is self-managed or organization managed. If not stated explicitly, they can be inferred from what actually happens. Consequently, the first major design issue is a specification of critical training needs.

Determining Training Needs

By our definition, training needs to reflect current *or anticipated* deficiencies in determinants of performance that can be remedied, at least in part, by a training intervention. Training needs exist in a number of contexts. For example, current job holders may be deficient in terms of their performance, and the primary purpose of training is to remedy the deficiency. In a different context, if eligibility for promotion is a function of high performance on particular performance components, training on the determinants of those performance components may be offered to, or sought by, anyone wanting to be considered for promotion. Also, certain components of performance may be forecasted to be critical in the future; as when new kinds of equipment will be introduced, or new environments must be accommodated. For example, what will be the training needs for air traffic controllers when new and very different air traffic control systems come online. Finally, training may be needed for the determinants of performance components that must be executed in totally new environments, as when training people to drive a car on the moon, or withstand a long trip to Mars. Spitzer (2005) also makes the point that subsequent training evaluation also begins with an analysis of the training needs that are most critical for advancing the goals of the organization itself. Managements must be a party to this aspect of a training needs analysis.

A traditional needs assessment would have three major steps: (1) a description of the factors that comprise effective performance, (2) specifications of the determinants of performance on the factors, and (3) identification of the performance determinants that would benefit from a training

intervention. Step 3 could focus on individuals (the traditional person analysis) or on teams, or on forecasted future training needs for everyone in an occupation, or even for everyone entering the labor force (e.g., US Department of Labor's Secretary's Commission on the Achievement of Necessary Skills, 1992). This makes virtually all job analyses and criterion development methods relevant for training needs identification.

However, using the available work analysis methods to identify training needs is hampered by several factors. First, while there has been much recent progress in developing descriptive models of work performance (Campbell & Wiernik, 2015), such efforts are still relatively primitive for purposes of identifying training needs. That is, current models describe a small number of factors that are still very broad in nature. This may be quite valuable for guiding research on personnel selection, but for training purposes we must move down the hierarchy to more specific factor descriptions. In this regard, the most progress has been achieved in describing the components of leadership/supervision (Campbell, 2012) and now perhaps 'performance as a team member' (Olson, 2000). More on this issue later.

Another constraint is that current methods for identifying and mapping performance determinants (KSAs) rest on the judgments of subject matter experts (SMEs) who are asked to 'link' KSAs to performance factors. Unfortunately, the KSAs themselves, at least those that are potentially trainable, vary from being 'adequately' specified (e.g., requires 'statistical analysis skills at the introductory course level') to being significantly underspecified (e.g., requires good 'writing skills') to being woefully underspecified (e.g., requires high 'adaptability'). Perhaps the worst example of under-specification is to ask an SME to rate the criticality of 'problem solving skill' as a performance determinant. We assert that at its current level of specification, non-domain-specific problem solving skill is a virtually meaningless construct for purposes of identifying training needs (Kuncel, 2011). More about this later also.

Finally, a third difficulty is the crudeness of our methods for identifying the performance determinants that are amendable to a training intervention. That is, what kinds of determinants are trainable and which are not? We may pay too much attention to the obvious suspects, namely specific knowledge and skill deficiencies. What about the attitudes and dispositions that govern choice behavior?

While most job analysis methods operate at too general a level and require SMEs to make too many judgments about very underspecified variables, which reduces their usefulness, there are

two methods that address training needs more directly. One of these is the critical incident technique (Anderson & Wilson, 1997) which asks relevant observers to consider a potential population of specific performance examples and describe a sample of specific episodes they have witnessed that reflect very effective and/or very ineffective performance. The describers can also be asked why the individual was able to exhibit the effective episode or what antecedents led to the ineffective incident. While the inferences about causal determinants are still subject to the errors of human judgment (Morgeson & Campion, 1997), which can never be eliminated completely, the inference is tied to very specific events. The individual is not required to infer linkages between broad constructs and broad factors comprising job performance.

The critical incident technique is sometimes grouped within a broader class of methods generally referred to as cognitive task analysis (CTA) (Chipman, Schraagen, & Shalin, 2000). In one sense the literature on CTA, which is now relatively large (Crandall, Klein, & Hoffman, 2006; Hoffman & Militello, 2009), represents an attempt by cognitive psychology to define work analysis as part of cognitive science, since most work is now mental rather than physical. However, most of the CTA analysis techniques are not new and encompass various interviewing formats, observational techniques, and protocol analysis methods. There are many variations of these basic methods, from the standard job analysis interview, to software models for eliciting protocols, to interrupted recall techniques for people watching themselves on video tape. Summaries of methods are provided by Annett (2000), Cooke (1994), Schraagen, Chipman, and Shalin (2000), Crandall et al. (2006), and Hoffman and Militello (2009).

Turf battles aside, CTA does provide certain types of information for specifying training needs that are not addressed by more 'traditional' methods. This occurs because the general goal of CTA is to explain the determinants of expert, as compared with novice, performance. Consequently, while traditional job analysis attempts to describe the content of a work role and infer the KSAs that would be correlated with individual differences in performance in that role, CTA attempts to address *how* individuals are able to perform work tasks at a particular performance level. To be more specific, how does the expert do it?

The framework for exploring how the expert does it is taken from cognitive science representations of performance determinants. That is, while a CTA begins with a 'traditional' description of the work content, the procedure then attempts to recover information such as the following:

- The way in which the expert/novice translates the prescribed work goals into their own operative goals.
- The mental models, or personal theories, experts/novices use to represent their performance requirements and work context.
- The cognitive resources experts/novices use to accomplish the tasks they deem important. Cognitive resources are usually represented as the relevant knowledges and skills that are used, and the cognitive strategies and strategy selection rules that are used to apply them.

In sum, what individual goals, mental models, cognitive resources, and cognitive strategies do experts use that distinguish them from novices? As outlined by Chipman et al. (2000), there are three principle applications of CTA: (1) specifying the determinants of expert performance for purposes of training and selection; (2) aiding the design of human/system interactions; and (3) analyzing the bases of effective teamwork. The number of bona fide applications of CTA to the specification of training needs is actually quite small. Much more effort has been directed at using CTA for software development to aid decision making, construct control systems, or construct the teaching protocol itself.

One of the most direct applications of CTA methods was the identification of training needs for air traffic controllers (ATC) reported by Means et al. (1988). Several different analysis methods were used to elicit the goals, mental models, knowledge and skill representations, and cognitive strategies used by a sample of experienced controllers when dealing with simulated control tower ATC job samples at a major airport. The participant experts were first asked to think out loud about how they would deal with a set of air traffic situations as portrayed by the paper copy flight strips. They were then asked to watch a video of a controller working on a simulation of an air traffic scenario. The simulations were run on ATC training equipment which was identical to the actual equipment and displays used in the tower. Part way through the simulation, the video was stopped and the participant was asked to take over and to verbalize what he was going to do, and why. Then each participant was asked to work through three additional 45-minute simulations using the same equipment. Finally, each participant completed a series of post-simulation memory tasks such as recalling and drawing the traffic patterns, recalling the flight strips, and recalling significant events that happened during the scenarios.

The analysis produced considerable protocol information concerning the mental models, cognitive resources, and cognitive strategies that

experienced controllers seemed to use. For example, one frequent mental map of the air traffic sector organized planes by the type of problem they represented rather than topographically. Experienced controllers had an amazingly detailed knowledge of what happens in the sector each day, and they engaged in a continual process of prioritizing potential problems extending over a fairly long time frame. It was also the case that experienced controllers had developed some task elements to automaticity. That is, they could perform one task automatically (data entry using a keyboard) while simultaneously working on a controlled processing task (talking to pilots). These and other findings led directly to training prescriptions to accelerate the development of ATC expertise. The finding that a high level of performance is often a function of developing critical tasks to a state of automaticity, such that they no longer require attentional resources, leads to the prescription that the analysis of high level performance in terms of its consistent versus controlled processing components should be an important part of analyzing training needs (Rogers, Mauer, Salas & Fisk, 1997).

Another application of CTA methods is incorporated in the research on naturalistic decision making (Klein, 2008) which attempts to model how experts make decisions and solve problems under stressful or time-constrained conditions. The most frequent kind of CTA method used in this context has been the post-event interview, with variations. The training implications of such data will be discussed later in the chapter in the context of problem solving and decision making. Dachner et al. (2013) make the general point that unstructured interviews of relevant experts is a particularly valuable CTA technique for determining training needs for dynamic, or as yet unknown, work situations. Their specific example concerns crew training needs for space missions. A less 'naturalistic' technique is 'elicitation by critiquing' (EBC) as described by Miller, Patterson, and Woods (2006), which utilizes simulations as a vehicle for eliciting expert and unexpert performance that can be critiqued and contrasted in terms of performance determinants. A thorough discussion of the elements that must be considered when eliciting information about how 'experts do it' is provided by Hoffman et al. (1995).

In general, CTA methods build on the more traditional job analysis techniques and do provide additional information about what explains higher level versus novice performance. Unfortunately, it can quickly become time-consuming and expensive and is not feasible for all training design problems. However, even a modest amount of time spent trying to contrast the resources and methods used by novices and experts could provide useful

information regarding training needs, keeping in mind at least one major qualification. There can be degrees of freedom problems in CTA and the training designer must avoid being misled by the idiosyncratic expert.

For some components of job performance, the needs analysis may need to be done within cultures. Galperin and Lituchy (2013) cite the examples of identifying the determinants of customer service performance. Such determinants could reasonably be expected to vary across national and regional culture.

It is also the case that training needs can be self-identified, which in today's economy is becoming more and more important. It is the first step in a self-regulated training design, as well as an organizationally sponsored design, and is an important component of metacognitive skill. Finally, Iqbal and Khan (2011) make the point that a needs analysis of performance determinants is useful for more HR concerns than just training. Their list is quite long.

SPECIFYING TRAINING OBJECTIVES

Once training needs are identified, they must be translated into training objectives that lead directly to specifications for training content. Needs assessments, as described above, are not statements of objectives. Objectives identify what the learner should know, be able to do, or believe after finishing the program that he or she could not do, or did not believe, before. They are stated in observable terms, and they include some indication of the conditions under which the individual should be able to exhibit them and at what level of proficiency or intensity. This is the heart of training design. If the training objectives cannot be specified, it implies that we cannot be clear about what to teach. These statements are often attacked as shopworn rhetoric that is no longer useful (Gordon & Zemke, 2000). Nothing could be further from the truth. It does not matter whether one's orientation is behavior analysis, cognitive science, constructivism, discovery learning, active learning, or consultant of the month. Any training program that is actually implemented will focus, if only by default, on achieving some kind of change that can be exhibited at some level under some set of conditions or constraints. In practice, describing the training objectives explicitly is not an easy task, which may be one reason people tend to avoid it.

An important meta-issue here is that each training objective must incorporate the appropriate

'capability'. For example, a training course for data analysts could formulate objectives having to do with correctly formatting data files and using the proper commands to run standard data analysis software, or it could specify objectives for teaching analysts how to solve novel analysis problems. The former has to do with the correct execution of certain well-specified steps, while the latter requires problem solving of a specific technical sort. That is, the capabilities to be learned are different. While this is a rather obvious example, the situation when it is not so obvious could lead to a serious misstatement of the training objectives (Gagné et al., 2005).

Table 19.1 is a suggested framework for highlighting differences among the major types of capabilities that could be the objective of a training intervention. Thinking in taxonomic terms at this stage is intended to help avoid incorporating the wrong capability in the description of a training objective. There is nothing particularly startling about this taxonomy. All are legitimate training objectives and no hierarchy of importance is implied. The distinction between a proceduralized knowledge capability and a skill capability is the conventional one that distinguishes knowing what to do from being able to actually do it. Sometimes the difference between knowing and doing is small (e.g., computing descriptive statistics) and sometimes it is very large (e.g., resolving conflicts between subordinates). However, the classic instructional design mistake is teaching one (e.g., knowledge) but hoping for the other (e.g., skill).

A knowledge capability frequently mentioned in the current literature is the *mental model*. The specifications for mental models are not overly precise but in general they refer to personal theories about the current state of something (e.g., a team's current level of performance) or about how things work (e.g., if we spent more time collaborating, performance would be better). One training need for teams might be to promote similar team member mental models for how the team should work that are correct. Mental models can include several of the kinds of knowledge capabilities included in Table 19.1.

The word skill is used in almost as many different ways as the term performance. We have tried to give it a more specific and more useful meaning here. Skills are learned and they reflect the successful application of relevant knowledge capabilities to solve problems or produce outcomes that can be well-specified such that the correct solution or desired outcome is known, and the methods and procedures used to generate successful solutions or outcomes are known as well. For example, there are correct ways to solve linear programming problems, erect the frame for a house, and slalom ski.

All of these are well-structured problems to which known procedures can be applied. This does not mean that mastering the methods and procedures (i.e., skills) is easy or that knowledgeable people no longer argue about *precisely* the best methods to use (e.g., for striking a golf ball).

The problem solving capability refers to the application of knowledge and skill to developing solutions for *ill-structured problems* (Newell & Simon, 1972). That is, for ill-structured problems there is no a priori correct, or best, solution; the knowledge and skills that are the most applicable are not completely specifiable; and the problem or goal itself may not be easily identified. This characterization is meant to be consistent with that of Greiff, Wüstenberg, and Funke (2012). As argued below, the training implications are different for a skill versus problem solving capability. Also, by this definition, effective problem solving is the successful application of acquired knowledge and skill to an ill-structured problem when what constitutes a 'successful' solution is necessarily a judgment call by knowledgeable people. This capability is an important training objective for most graduate programs, be it psychology or computer science. However, there seem to be no *general* rules (e.g., define the problem, gather data, develop possible solutions, evaluate solutions) that are very effective. Effective problem solving is domain specific. That is, generating effective solutions depends on a high degree of knowledge and skill in specific relevant domains. We will discuss this point further in a later section.

Similarly, there is no general *adaptive* problem solving capability, as much as some would like there to be (e.g., Bransford, 2007). If adaptability is defined as a particular kind of high performance (e.g., responding effectively when performance requirements change) then it is in large measure, domain specific as well (Campbell & Wiernik, 2015). Bransford (2007) argues that adaptive experts are (a) always training to learn new things and (b) constantly reflecting on why established procedures might not work. These are dispositions, not 'skills', and imply a different training objective.

Attitudes and beliefs are included in the capability taxonomy because they are the explicit or implicit capabilities of interest in many training programs directed at such things as individual self-efficacy (Gist, 1997), attitudes toward sexual harassment, or beliefs concerning the procedural justice of personnel policies. Two things are important to know about such capabilities. First, the linkage between changes in attitudes or beliefs and the desired (hoped for?) changes in behavior is a complex one (Ajzen, 1985) and far from guaranteed. Second, while the capability specified or implied by the training objective may be an attitude or belief,

the training content itself could include knowledge, skills, or problem solving. For example, men may hold sexist beliefs because (a) they do not know their current beliefs are sexist, (b) they have no nonsexist interpersonal skills relevant to interactions with women, or (c) they cannot recognize and deal with new or unique harassment contexts. Training to change attitudes must also deal with the issue of implicit versus explicit beliefs (Greenwald & Banaji, 1995), and the difficulty of making fundamental changes in implicit beliefs (e.g., having to do with race or ethnicity).

In sum, the description of the training objectives is the fundamental step in training design, and probably the most neglected. This is as true for self-managed training, active learning, or informal continuous training as it is for training formally designed by the organization's HR unit. Producing objectives with the above specifications requires much cognitive effort, and it is difficult to develop very powerful reinforcement contingencies for maintaining such behavior on the part of training designers, even if the training designer is yourself. It is too much like eating and exercising properly. We know what we should do, but there are always very persuasive people who promise much easier solutions. Again, the goal is to specify what the individual should know, be able to do, or believe after the training experience that they did not before.

Finally, given the range of different kinds of capabilities that could be identified for training goals, it is reasonable to expect that different kinds of objectives would require different instructional methods. Remember that the foundation of how we learn is providing the right kind of effortful processing. The appropriate effortful processing would be different for different knowledge capabilities, different skill capabilities, different attitudes and beliefs, and for different problem solving domains.

SPECIFYING TRAINING CONTENT

The training content is dictated by the training objectives. It is composed of the knowledge, skills, and patterns of choice behavior that the trainee must acquire to be able to meet the objectives. By definition, being able to exhibit the objectives is dependent on mastery of the training content. For example, what content must a graduate student master to write a research proposal, make a presentation to a relevant audience, or write down a research question? The distinction between training objectives and training content is important, but sometimes subtle. Sometimes they

are very similar (using a keyboard for word processing) and sometimes they are not (e.g., learning more about your own personality so as to facilitate acquisition of team member skills). Besides identifying content elements, the sequence in which they are to be learned must also be specified. If the sequence is not clear, either the objectives or the subject matter, or both, are not well enough understood (Gagné et al., 2005).

Content specifications can be determined from four principal sources. One is simply to survey the landscape of previous attempts to develop training for closely related objectives, being careful to pick and choose carefully. Another is to use expert judgment. People who 'know' the topic specify the training content. Content can also come from more formal theory. For example, in basic skills there are now rather well-developed conceptual descriptions of what arithmetic is (Resnick & Ford, 1981). Closer to home, certain theories of leadership provide a specification of what knowledge and skills must be mastered to enhance leadership performance (Yukl, 2013). However, one reason that leadership theory has not progressed further than it has is that a comprehensive substantive model of leadership performance, and its prerequisite skills, has never really been provided. Training and development will become more powerful as our taxonomies and substantive understanding of performance phenomena grow. We simply need much more research on what constitutes competent performance in various important domains (Ericsson, 2009; Glaser & Bassok, 1989). Finally, a major contribution of research in cognitive and instructional psychology to the methodology of content specification is again the application of a wide variety of CTA techniques to elicit the knowledge, skills, and strategies that high level performers use, in contrast to novices. Such methods can focus either on the expert protocol, so as to elicit the information, skill, or problem solving capabilities that should be enhanced, or on the novice protocol to discern the faults and mistakes ('bugs') that should be corrected or avoided (Hoffman & Militello, 2009; Schaaftal & Schraagen, 2000).

One CTA technique for representing the training content that seems overemphasized is the elicitation of expert versus nonexpert semantic networks. That is, participants are asked to consider an array of concepts and procedures, and judge the relative similarity between each possible pair. Once the similarity matrix is obtained, various multidimensional scaling or network analysis techniques (e.g., Pathfinder) can be applied to obtain a dimensional or relational latent structure for the concepts (Goldsmith & Kraiger, 1997; Kraiger, Salas, & Cannon-Bowers, 1995).

A recurring finding is that the similarity matrix is not the same for experts as it is for novices and a different dimensional or cluster structure is produced (e.g., Davis, Curtis, & Tschetter, 2003). Granted that training and experience can produce changes in such a similarity matrix, it is not clear how this information is useful for training design. The concepts to be clustered usually have very little specification beyond the name or title and the respondents are not asked to generate explanations for their similarity judgments. Relative to the taxonomy of capabilities given in Table 19.1, this procedure may not capture the content that must be mastered to be able to exhibit the capability specified by the training objectives.

For self-managed instruction, it is the individual's responsibility to identify the content to be learned. This may be easy or difficult, but in the spirit of expert metacognition, individuals should not assume that they already know what content they must master to meet their learning/training objectives. A willingness to seek knowledgeable help can be quite valuable.

SPECIFYING INSTRUCTIONAL METHODS AND TRAINING MEDIA

Given that a particular body of content is to be learned, the next consideration is the set of instructional methods that should be used to teach or promote mastery of the content. We use the term *instructional methods* to mean the *generic* teaching methods or learning events that are potentially available. For example, the direct presentation of information to the student/trainee is a generic instructional method, as is simulation. A generic learning method might be executed through any one of several specific techniques, or *media*. For example, information presentation is possible via reading, lectures, or the Internet. This is a 'generic' versus 'brand name' distinction and we would argue that the number of generic methods is relatively few. Table 19.2 is a suggested taxonomy of such methods. They differ primarily in terms of the kind(s) of effortful processing they require of the learner. The generic versus brand name distinction is also addressed by Bedwell and Salas (2010), Clark (1994), and DeRouin, Fritzsche, and Salas (2005) with regard to e-learning. Any given e-learning-based training program could incorporate one or more generic methods.

For some of the generic methods, the past 15–20 years has seen an explosion in the number of specific technologies. For example, the military has continued to develop sophisticated

simulations for a wide variety of weapon system operations, and for unit combat and combat support operations (Chatham, 2009a). Training simulations have also been developed for a number of medical specialties (Davis, 2009), particularly in the surgical specialties that involve robotic or laparoscopic technologies. The use of computer games to teach skill capabilities is also increasing (e.g., Bedwell et al., 2012; Chatham, 2009b). Simulations and computer games of various kinds provide a means to elicit relevant cognitive effort (and perhaps psychomotor and physical effort as well) that aids in moving knowledge and skill to long-term memory. However, the medium is not necessarily the message, and the brand name technologies must reflect the intended training objectives and training content, and not just experiences that are 'interesting' or entertaining. Wilson et al. (2009) have reviewed the literature dealing with 'gaming effects' on a variety of reactions criteria, as well as, for a few studies, effects on knowledge and skill. The results are generally positive, but interpretation is hampered by the fact that 'games' can differ substantially on a number of parameters (e.g., communication rules, feedback to players, adaptation to the learner's skill level) and their differential effects are not known. Consequently, the nature of effortful processing required of the learner can vary, perhaps in unknown ways, across different games. Sitzmann (2011) conducted a meta-analysis of experimental group versus control group evaluations of computer-based simulations/games. In general, using a variety of end-of-course criteria, the simulations/games were superior to 'conventional' instruction. However, when the control group used methods that also incorporated active processing, the differences essentially disappeared. Although this parameter has not been investigated, the simulation and computer game platforms do have the capability of continually raising the training content knowledge and skill requirements, as the trainee becomes more proficient, without exceeding the trainee's capabilities. This could be a very powerful parameter for training purposes. Building simulations or game platforms for specific training domains is not inexpensive, but the number of prototypes is increasing and costs may come down.

In sum, there are two critical features of instructional methods that training design should attempt to optimize (Gagné & Briggs, 1979; Glaser, 1976; Pintrich, Cross, Kozma, & McKeachie, 1986). First, the response 'capability' incorporated in the training objective and the training content should be represented with as much fidelity as possible by the training method. For example, if the capability is electronic troubleshooting, and troubleshooting is specified as an application of known procedures to

Table 19.2 Taxonomy of generic instructional methods relevant for occupational training

1. *Information Presentation.* From traditional lecture to distance learning to the modern MOOC (massive open online course), probably the most widely used method is simply the presentation of verbal, numerical, figural, auditory information to the learner, to do with as they choose. However, even though the information presented may include guides and suggestions for how to use the information, the ways in which the information is actually processed is not known. Additional cognitive effort must be supplied by the trainee, perhaps in the form of taking notes, writing summaries, or self-testing. Bjork, Dunlosky, and Kornell (2013) summarize the research on such self-managed techniques. However, other things being equal, we would expect no differences in learning as a function of the specific presentation method (e.g., lecture vs e-learning) itself.
2. *Modeling.* One very specialized form of information presentation is using a model to demonstrate the desired responses, which could be verbal, social/expressive, psychomotor, or motor. Modeling seems to deserve its own niche because it is the information presentation technique that is most easily directed at a skill capability. The model may be the instructor, a live actor, a video representation, a virtual reality event, or perhaps even a robot (e.g., the golfer known as Iron Mike). The distinction is between *showing* how something should be done versus *telling* the trainee what to do. Again however, incorporating effortful processing requires additional steps.
3. *Information Presentation Plus Provision for Learner Responses.* Many instructional techniques attempt to actively engage the learner voluntarily, varying from simply providing the opportunity to ask questions, to more structured question and answer periods, to some form of cooperative learning (Johnson & Johnson, 1975) in which the trainees take turns presenting the material and dealing with questions. Web-based instruction can provide chat rooms, asynchronous discussion periods, or actual instructor responses. Again, it is the nature of the trainee engagement that is critical, not the media of engagement, and for this method the nature of the engagement is largely controlled by the learner. Whether or not this generic method promotes the most useful effortful processing is a bit haphazard, and may vary widely across trainees.
4. *Systematic Response Generation.* A wide range of instructional events require the learner to produce specific kinds of responses that are directly relevant for the training objectives. That is, they are designed to be so, such as solving math problems, responding to instructor questions in foreign language instruction, providing a diagnosis of equipment or system malfunctions, demonstrating how to operate equipment or systems, performing specific physical requirements, etc. The common elements are that an active response is *required* of the learner and the desired response (i.e., effortful processing) is designed to be directly relevant for the training objectives. Legitimate issues arise over how detailed and structured (i.e., guided) the response requirement should be and the degree to which the trainee is allowed, or encouraged, to make (and possibly learn from) specific errors (Frese et al., 1991; Heimbeck et al., 2003; Lorenzet, Salas, & Tannenbaum, 2005). Also, there can be disagreement as to how completely the desired responses are 'situated' in a context which comes as close as possible to the job context in which the capability is to be used (Anderson, Reder, & Simon, 1996). In general, the degree of guidance provided should be the minimum required to keep effort focused on the capabilities specified by the training objectives and prevent ultimately learning the wrong things, within the time constraints imposed by the organization's or individual's resources.
5. *Simulation.* Simulation methods are a direct attempt to represent all the relevant elements of the actual job tasks with as much fidelity as possible for the stimulus conditions, the response requirements, the conditions under which the response requirements (i.e., training objectives) are to be exhibited, and the difficulty of the response requirements for the trainee. Obviously, there can be great variability in the bandwidth and fidelity for the stimulus conditions, response requirements, and contextual features represented by specific simulators. Research suggests that the fidelity of the response is more critical than fidelity of the stimuli.
6. *Gaming.* As noted by many (see Bedwell et al., 2012), gaming is threatening to become a generic method of its own. It is distinguished by a number of features, but perhaps the most critical are that it is computer-based, highly competitive (for the trainee), intrinsically interesting (for most people), and can be played singularly or in teams. Whether the game platform reflects the training objectives and incorporates appropriate processing of the right capabilities are critical issues (Bell, Kanar, & Kozlowski, 2008; Wilson et al., 2009).
7. *On the Job Training.* OJT is no longer simulation; it is the actual work context. However, this does not guarantee that the content of the OJT experiences are directly relevant for the training objectives. Just because the method is executed on the job does not absolve the training design of identifying training objectives that are based on valid training needs, ensuring that the content of OJT addresses them, and providing appropriate feedback. Experience may or may not be the best teacher. There are also brand name methods for OJT, such as mentoring, coaching, apprenticeships, and special assignments. 'Embedded' training is not OJT, although it takes place in the ongoing work interaction. The term usually refers to computer-based information presentation that job holders request or look up when they are in the work setting, and perceive the need for additional information.

identify one or more knowable malfunctions (i.e., troubleshooting skill), then the training method should provide an opportunity for the learner to generate the appropriate application of acquired knowledge to the specified troubleshooting problems. However, if a course in software design is intended to reflect a problem solving capability, the teaching method should provide a series of novel and incompletely specified problems as stimulus material. In addition, the design must ask whether this training objective is also a function of knowledge and skills that must be mastered before the problem solving capability itself can be addressed. Designing training methods to incorporate the desired capabilities will be successful to the extent that the functional descriptions of the necessary capability are (1) valid and (2) substantive enough to guide the training design.

A second critical feature of the method is that, whatever the capability to be mastered, the learner must be allowed, encouraged, or induced to actively 'produce' that capability during training. Production (i.e., appropriate effortful processing) facilitates both learning and retention (Perry & Downs, 1985; Schmidt & Bjork, 1992). This is as true for a knowledge capability as it is for a physical or cognitive skill. For example, if a training objective concerns knowledge of a new tax law, the training method must induce the trainee to produce or construct that knowledge in one or more ways. 'Error-based' instructional methods (Frese et al., 1991; Frese & Keith, 2015; Ivancic & Hesketh, 1995/1996) attempt to increase cognitive production by allowing trainees to commit errors and then analyze and correct the source of their errors. An interesting research question is whether such error-based instruction would be differentially effective depending upon the type of capability.

At this point, if the above issues have been addressed, we have arrived at a basic specification for training objectives, training content, and generic instructional methods. It is only now that the pros and cons of alternative brand names techniques (e.g., specific information presentation media, specific simulators, etc.) become relevant.

Unfortunately, the literature on training methods tends not to focus on the right issues. It is still more interested in brand name hype than the effectiveness of generic methods. For example, there has been much discussion of e-learning and computer-based instruction, and their comparison to 'traditional' methods for quite some time. However, both 'e-learning' and 'traditional' methods can incorporate different generic methods, and whether e-learning is better or traditional methods are better is a function of the generic methods that are actually incorporated in each. Also, 'learner control', which is touted as an advantage

of e-learning, within a constructivist point of view, can be a good thing or not such a good thing, depending on whether the trainee knows how to use such control. A certain amount of guidance is virtually always necessary (DeRouin, Fritzsche, & Salas, 2004; Lorenzet et al., 2005).

While brand names can vary in terms of the validity with which they provide the opportunity to produce the relevant responses for teaching a particular capability, the bulk of the potential utility of a training design has already been captured by the preceding steps. In this regard, it is worth noting that buying the latest brand name techniques is where many instances of training design actually start, unfortunately.

Historically, this is also the point where much of the research on learning and skill acquisition begins. That is, the training objectives, training content, and generic instructional methods are taken as given and the research questions focus on the optimality of the *learning conditions* incorporated in a specific instructional method. Some of these learning conditions have received a 'new look' in the last 10–20 years.

EFFECTIVE INSTRUCTIONAL CONDITIONS

For purposes of maximizing acquisition, retention, and transfer, research questions have revolved around the effectiveness with which instructional methods (a) provide appropriate goals for the learner (trainer-generated, self-generated, or cooperatively determined), (b) provide the opportunity for appropriate kinds of practice, (c) provide the appropriate types of feedback, and (d) keep the learner motivated and interested. These are in fact the classic 'learning principles' (Blum & Naylor, 1968).

Goals

As discussed above, the training objectives constitute the end-of-course goals for the trainee; and these objectives are distinct from the more proximal goals that can operate during the period of instruction. The last 40 years have generated a large research literature on goals as a powerful determinant of individual performance (Latham, 2012; Locke, 2000; Locke & Latham, 1990; Schmidt et al., 2012). While we do not want to recapitulate all of that, it does deal with a number of issues that are particularly relevant for training.

Goals can influence performance via one or more of three general mechanisms (Kanfer, 1990).

First, goals can inform people as to where they should direct their efforts. Second, goals can provide the standards or criteria upon which outcomes or rewards are contingent and by which learners can judge their progress. Third, goals can set the occasion for using different strategies for goal attainment, as when the individual concludes that simply increasing effort will not by itself lead to goal attainment. All three of these mechanisms assume that the individual has made a commitment to the goal. There are many different kinds of goals. In general a goal is a desired 'state' and can refer to an outcome, a process, an event, an emotion, or a skill. It is not limited to a performance outcome that can be quantified.

Also, we are separating a discussion of goal effects from a later discussion of motivation itself. For the parameters of goals to affect behavior there must be commitment to the goal. In the absence of commitment, goals do not affect behavior. In modern parlance the level of commitment to the goal 'moderates' its effect on performance. Commitment is motivation. A meta-analysis of the moderator effects of commitment on goal setting is reported by Klein et al. (1999).

Within the instructional process itself, goals can be difficult or easy, general or specific, and distal (i.e., the final learning objectives) or proximal (i.e., subgoals for different parts of the instructional sequence). Also in the instructional context, a major distinction is between learning goals and performance goals (see Latham, 2012). In traditional goal setting research (Locke & Latham, 2002) goals referred to performance outcomes that could be scaled quantitatively (e.g., number of trucks loaded). Difficult, but reachable, specific goals yield higher performance than less difficult or 'do your best' goals, assuming goal commitment (which may or may not be the hard part). End-of-course achievement tests are performance goals. Learning goals are framed as devoting effort to the process of mastering new skills, new strategies, or new domains of knowledge. The emphasis is not on final course performance but on the process of learning. Other things being equal, specific difficult performance goals, if they are accepted, lead to higher performance. However, in the instructional setting other things may not always be equal. Difficult goals may not be accepted (i.e., committed to) because the costs outweigh the benefits of goal attainment and people differ in how they evaluate the positive and negative outcomes of goal attainment (Kanfer, 1990). Also, providing proximal goals too early in instruction, or too frequently, may direct too much attention away from the mastery process itself (Kanfer, 1990; Kanfer et al., 1994). However, despite their attentional costs, specific proximal performance goals may be

more necessary for low ability or poorly prepared learners as a means for guiding their efforts (Snow, 1989). An important conditional here is that the nature of the proximal goals themselves must not be so difficult they are beyond attainment.

If the material to be learned is complex, as it would be for most training experiences dealing with skill or problem solving capabilities, then using difficult performance goals may be harmful. Recent research shows that in such instances learning goals, or even do your best goals, are consistently more beneficial than specific difficult performance goals (Latham, 2012). The effects of goals are also dynamic in terms of how the effects change over time particularly if multiple goals compete for the learners' attentional resources. For training purposes it would be best if that did not happen. For most instructional purposes, learning goals take precedence over performance goals and instruction should be careful not to incorporate competitive goals that sacrifice one for the other.

The goals for trainees incorporated in the instructional method may be congruent with or divergent from the 'sense making' goal retranslations made by the trainees themselves (Baldwin & Magjuka, 1997). For example, individuals may see the goals for technology training as a signal that management thinks they are less than competent which in turn has deleterious effects on their commitment and motivation (Klein & Ralls, 1997). In general, the goals communicated to the trainees by the instructional design are a critical influence on learning and deserve careful attention. If the instructional program is self-managed, the disparity between the prescribed goals for the learner and the retranslated goals they actually use should disappear, but the goal setting effects will still be operative. That is, self-regulation of training must also incorporate appropriate goal setting.

The above considerations relate to the effects of conscious goals on trainee efforts. There is also a growing literature on the effects of subconscious goals on behavior and the activation of such goals via 'priming'. (e.g., Bargh et al., 2001; Bargh & Morsella, 2008; Shah, 2005). Latham, Stajkovic, and Locke (2010) summarize a series of studies on the interactive and main effects of priming on work performance that have relevance for training performance. A very brief summary of their summary is that, although this stream of research is in its infancy, priming does influence performance, at least over relatively short periods of time. In this series of studies, subconscious goals are primed by unobtrusively placed photographs of other individuals being very goal-directed. For example, small photographs of individuals working intently in a call center, that were placed in the corner of the instructions for the actual employees, yielded

higher performance (i.e., number of successful calls) than neutral photographs, or no photographs at all. The effects of conscious and subconscious goals are generally additive, but conscious goals have larger effects. Further, the prime appears to increase the number of achievement-related responses to the thematic apperception test, which may provide an explanation for why primes work. That is, they activate one's need for achievement. Questions yet to be addressed in the training context are such issues as: (a) can priming affect learning goals as well as performance goals?; (b) if so, what are the most effective primes?; (c) how can such primes be administered?; (d) what is the duration of their effects?

Feedback

Feedback is a venerable topic in training and instruction. Traditionally, feedback has been seen as having both motivational and informational properties, and the prevailing opinion was that instructional methods should provide lots of it. That is, feedback is good. Relevant to occupational training, there have been three influential reviews of feedback research and theory (Balzer, Doherty, & O'Connor, 1989; Ilgen, Fisher, & Taylor, 1979; Kluger & DeNisi, 1996), which have provided an increasingly differentiated view of the role feedback plays in instruction.

Feedback can come from several sources (Blum & Naylor, 1968). It can be intrinsic (information generated internally such as when the adjustment to a control 'feels right') or extrinsic (the feedback information comes from external sources); and, if extrinsic, it can be primary (based on the individual's self-evaluation of external events) or secondary (based on someone else's evaluation of the trainee's performance). The general findings have been that feedback has significant effects on behavior to the extent that all appropriate sources are used (e.g., does the instructional method allow people to monitor their own performance), it is relatively frequent, and not excessively delayed. In addition, feedback must be accurate, and accepted as accurate. Acceptance is a function of a number of factors (Ilgen et al., 1979) such as the perceived expertise, reliability, power, and attractiveness of the source. Also, the effects of positive and negative feedback are not equal (positive feedback is generally better). However, negative feedback can have positive effects when it teaches people what they have done incorrectly. Also, positive feedback can have negative effects. For example, if feedback is too frequent it can decrease the perceived validity of the feedback (e.g., the individual begins to question the reasons for all the attention), or

prevent people from learning how to provide self-feedback (e.g., Goodman & Wood, 2004).

The review of the feedback literature by Kluger and DeNisi (1996), and their associated meta-analysis of feedback effects on performance, made some provocative hypotheses in an attempt to explain why (a) the effects of feedback were negative in almost 40% of the controlled studies, (b) feedback sign was not a significant moderator of feedback effects, and (c) verbal praise was worse than no feedback at all. In the Kluger and DeNisi review, the critical parameters seemed to be (1) whether increased effort or more knowledge and skill were the critical determinants of performance increments, (2) whether the content of the feedback was a general statement tied to the overall outcome versus being focused on specific performance determinants that could be changed (which they called cue feedback), and (3) the confidence or self-efficacy of the feedback receiver.

In general, they suggest that overall outcome feedback (particularly verbal praise) does not work, either because it directs attention away from the task and toward global ego-centered self-evaluations or because performance cannot be increased by a simple increase in effort. Virtually the only conditions under which general positive feedback might have positive effects on performance are when effort level is the primary determinant of performance and the learner suffers from low self-confidence; which may be a relatively rare set of conditions for occupational training. It follows that feedback should always be informational (it really has no useful incentive or reward function in the training context) and directed at specific things the learner did. Consequently, negative feedback can contain valuable information that will lead to performance improvement, particularly if the trainee is operating under a learning goal orientation. Goal commitment itself must come from other sources. The additional instruction (i.e., guidance) can come from self-management or from external sources (e.g., the trainer or a computerized tutor). Combining cue-oriented feedback with additional instruction on how to correct errors or enhance performance further is called 'adaptive guidance' by Bell and Kozlowski (2002), and can have powerful effects.

After-Action-Reviews

A particular kind of feedback, used for a long time in the military, but gaining more attention in other sectors, is the so-called 'after-action-review (AAR)'. It is perhaps most applicable to team or leadership/management training and occurs when the group or team completes a simulation, or actual work task, and then discusses what went right, what

went wrong, and the corrective actions that could be taken in the future (i.e., adaptive guidance). Studies showing positive effects of AAR are reported by DeRue et al. (2012) and Villado and Arthur (2013). King and Nesbit (2015) show how individual reflection (i.e., self-managed feedback) in a post leadership training interview can also promote learning. These studies also indicate that the positive effects of AAR are accentuated if the participants are conscientious, open to experience, high in learning orientation, and already have had experience with AAR. Further, the feedback discussion should be cue-oriented, in Kluger and DeNisi's terms. London and Sessa (2006) offer a detailed discussion of how feedback best operates in the team training context.

360 Feedback

Feedback for developmental purposes is also a big part of the 360 assessment literature (e.g., Bracken & Rose, 2011; Brett & Atwater, 2001; DeNisi & Kluger, 2000; Hazucha, Hezlett, & Schneider, 1993; Smither, London, & Reilly, 2005). Research findings pertaining to how the developmental and training benefits of 360 assessment can be maximized are consistent with the Kluger and DeNisi meta-analytic results. That is, the 360 instruments and procedures should permit 'cue-oriented' feedback on what individuals actually do and how it could be done better. It should be tied to goals that are not overly specific or too general (e.g., you must improve your 'people skills' is a 'bit' too general). It should not be too infrequent (e.g., less than once per year is very infrequent). It should be delivered by multiple sources, but not face-to-face. The feedback givers (e.g., raters) must be perceived as credible and legitimate; and the feedback should be followed by coaching, additional developmental experiences, additional goal setting, and further enhancement of self-regulation skills (Mulder, 2013).

Currently, it is probably safe to conclude that most 360 assessments for developmental purposes do not meet the 'ideal' just described. London and Mone (2014) offer a number of suggestions for how HR systems can better approach the ideal.

Summary

In summary, feedback plays an important role in instruction, *if* the individual is committed to the instructional goals. It should consist of specific information about specific errors that were made; and, it is best if it can be self-generated, or provided by the instructional program (e.g., computerized feedback) rather than through face-to-face social

interactions with external feedback givers. General positive or negative feedback should be avoided, except under a very narrow set of circumstances.

Practice

Practice, like feedback, is a venerated learning principle that has generated a large experimental research literature and which has also undergone some rethinking. Perhaps the most extreme position is taken by Ericsson and his colleagues (Ericsson & Charness, 1994, Ericsson & Smith, 1991) who argue that the primary determinant of a very high performance level is many years of *deliberate, guided* practice, and not basic aptitudes, which can get one only so far. Deliberate practice is very goal-oriented (e.g., Jack Nicklaus asserts that he never made a swing on the golf practice range without a specific goal in mind) and is intended to be virtually always under expert guidance. This assertion that thousands of hours of guided practice are a necessity has sparked much debate (Hambrick et al., 2014; Howe, Davidson, & Sloboda, 1998) over the efficacy of stable traits versus training and experience as the fundamental determinants of expertise. One element that seems less controversial is the recognition that an important determinant of expert performance often involves the development of critical skills to automaticity via appropriate amounts of practice (Rogers et al., 1997). This raises the issue of what performance determinants represent consistent skills and how much practice it takes to reach automaticity.

The research cited by Ericsson and Charness to support the value of large amounts of deliberate guided practice deals primarily with expertise in athletics, the performing arts, or very specialized cognitive skills. It is not clear whether the payoff would be equally large for occupations which depend on complex skills or problem solving capabilities that require very controlled processing and cannot be automatized. Controlled rather than automatic processing may be characteristic of most occupations.

A recent meta-analysis by Macnamara, Hambrick, and Oswald (2014) addressed some of these issues. They identified 15 estimates of the correlation between the amount of deliberate practice and performance across five occupational categories (music, sports, education, professions, and games such as professional chess). The mean correlation across all categories was .37, but for the individual categories it was games .51, music .47, sports .43, education .20, and the professions .10. The conclusion is that large amounts of guided practices do not explain performance differences when performance is based on controlled processing, which may be true of much occupational training.

The type and duration of practice can also be discussed in the context of performance in the training setting versus performance in the actual job setting (Ehrenstein et al., 1997). Schmidt and Bjork (1992) argue that very frequent practice in the training environment may not be optimal, and could even be harmful, for retention and transfer if every practice trial deals with exactly the same task and feedback conditions, and exactly the same context (Arthur et al., 1997; Shute & Gawlick, 1995). This might promote the highest level of skill acquisition in the shortest possible time in the training environment but it could harm retention and transfer for several reasons. First, frequent repetition of the same set of responses to the same task requirements in the training environment may not represent the relevant variation in the transfer situation. Negative transfer could occur. Second, making things 'easy' for the trainee will reduce processing demands during training and detract from the 'effortful processing' that facilitates long-term storage and retention. Third, providing continual external feedback from secondary sources makes it less likely that individuals will learn to correctly interpret their own performance errors and provide their own feedback, which they must do in the transfer environment. Consequently, practice sessions in training should vary the frequency of feedback, the conditions under which practice trials are conducted, and the nature of the task requirements themselves. Practice also consumes training time and there is always a tradeoff between time devoted to practice and time devoted to presenting additional training content (Carroll, 1997). Finally, designing practice to minimize learner errors may not be optimal for complex skills that are dominated by controlled processing. Here, errors and the steps taken to correct them can be very beneficial for both retention and transfer (Carlson, Lundy, & Schneider, 1992; Frese et al., 1991; Frese & Keith, 2015; Ivancic & Hesketh, 1995/1996; Keith & Frese, 2008).

In sum, the use of goals, feedback, and practice to optimize the effects of instructional methods on acquisition, retention, and transfer incorporates a complex set of contingencies that must be taken into account. Under a broad set of circumstances, certain kinds of goals, feedback strategies, or practice procedures can do more harm than good.

INDIVIDUAL DIFFERENCES

Individual differences in training achievement are ubiquitous. That is, any modestly reliable measure of training achievement will show significant

variability across trainees. However, if everyone gets the same training experience, what then accounts for these differences? Research addressing this question continues to accumulate, and much of it has been reviewed by Gully and Chen (2010), Beier and Kanfer (2010), and Latham (2012). Attention has been devoted to individual differences in cognitive abilities, personality factors, cognitive processes, interests, values, age, experience, and numerous properties of individual trainee motivation as predictors of training achievement.

Note that not all such correlations have identical implications. If the predictor variable is a stable trait that is difficult to change then multiple courses and a significant aptitude-treatment interaction (ATI) are necessary to realize gain in aggregate achievement by capitalizing on the correlation between the aptitude and achievement, unless selection for training is possible. If the predictor is malleable then main effects are possible (e.g., boosting motivation increases mean achievement in a course).

Cognitive Ability

If prior selection is not extreme and the training content deals with cognitive capabilities then general mental ability (GMA) will predict training achievement (Colquitt et al., 2000; Lohman, 1999); and in general, there will be a modest interaction between GMA and the degree to which the instructional methods provide organization and structure for the learner (Snow, 1989). However this general conclusion is conditional on the performance criterion being a function of controlled processing (i.e., task performance that cannot be automatized). For consistent tasks, end-of-training performance may be better predicted by specific abilities (Ackerman, 1992). This suggests the distinct possibility of two different ATIs, one that applies during the initial stages of training and another that applies to the final stages, as when trainees with high versus low specific abilities (e.g., perceptual speed) benefit from different kinds of practice. GMA also interacts with other individual differences such as goal orientation and metacognitive skill to heighten their effects on training achievement (Gully & Chen, 2010).

Personality

As represented by the Big Five, the relationship of personality to performance in training programs tends to mirror the results for the prediction of job performance itself, with some differences (Gully

& Chen, 2010). While the correlations are not large, the meta-analytic evidence (Barrick & Mount, 1991; Colquitt et al., 2000) suggests positive correlations for extraversion, openness, and the achievement facet of conscientiousness. Emotional stability and agreeableness have shown smaller correlations. The results for job performance itself are similar, with the exception of a lower correlation for openness and a higher correlation for emotional stability.

Locus of Control

Generally regarded as a single bi-polar dimension, an external locus of control represents the characteristic perception that events are not under the individual's control but happen because of the influence of others. An internal locus of control is the perception that events are under the individual's control. There is some evidence (e.g., Noe & Schmitt, 1986; Silver, Mitchell, & Gist, 1995) that internal locus of control is positively related to learning performance and more positive attitudes toward training, but overall the evidence is mixed.

Interests

There is very little research informing the relationships of vocational interests to training outcomes. What exists is summarized by Van Iddekinge et al. (2011). However, interests do tend to predict individual choices among training programs in contexts where such choice exists, such as colleges and vocational-technical schools. Much research remains to be done relating interests to the success of self-managed training and the tendency of individuals to adopt a continuous learning perspective.

Age

Age has generally shown a small negative relationship with training achievement and training motivation (Colquitt et al., 2000; Gully & Chen, 2010). This has generally been attributed to a decline in fluid intelligence (G_f) and an increase in knowledge gained from experience. However, one knowledge domain that does not show increases with age (in cross-sectional studies) is new technology, particularly the computerization of communication and work systems. Some of the implications for training designs are that older individuals may require remedial instruction in

computer technology, additional training in self-regulation and metacognition (Dunlosky, Kubat-Silman, & Hertzog, 2003), and increased opportunities for practice and self-pacing when attempting to learn skills that require rapid information processing. On the positive side, older individuals very likely possess a greater fund of domain-specific knowledge in critical areas, and training could be designed to take advantage of that. The bottom line is that training design should be adapted to better remediate or take advantage of age-related differences.

Motivation

What does 'motivation' mean in the training context? We think a reasonable position to take is that, corresponding to the direction, strength, and persistence of volitional behavior, the principal dependent variables of interest are (a) the trainee's decision to attend or not attend the program, (b) the level of attention and effort the trainee decides to invest in both learning and performance goals during training, and (c) whether or not the trainee chooses to finish the program. These are goals, and motivation deals with the determinants of commitment to such goals. Consequently, motivation in the training context refers to the independent variables that influence these three choices.

Because it is often not possible to assess individual differences in these choice behaviors directly, a number of investigators (e.g., Colquitt et al., 2000; Colquitt & Simmering, 1998) argue that it is useful to assess individual *intentions* to commit high levels of consistent effort to a particular training program. Such a construct has been labeled *motivation to learn* by Mathieu and Martineau (1997). It represents the classic distinction between the intention to respond and the actual response or behavior (Ajzen, 1985; Ajzen & Fishbein, 1980).

The 'motivational' independent variables that serve as potential determinants of one or more of these three choices are specified by three principal theoretical positions. The *dispositional trait* models see volitional choice as a function of stable behavior tendencies (e.g., a high need for achievement) that lead to individual differences in the characteristic pattern of such choices. *Cognitive expectancy* models focus on certain cognitive evaluations of the current situation, such as individual self-efficacy for being able to master the training content, the perceived instrumentality of training completion for obtaining particular outcomes, and the anticipated value (valence) for the salient outcomes. Finally, there is the *behavior*

analysis view that the motivational properties of training experiences or outcomes can be known only by their effects, and the specific outcomes that most strongly reinforce the desired choices must be determined empirically (i.e., by actually trying them out).

Motivational Traits

As relatively stable characteristics of individuals, the so-called motivational traits are related to, but distinct from, personality traits as represented by the Big Five (Gully & Chen, 2010). Chief among them are the stable components of the *self-concept*, the *trait* components of *self-efficacy*, *self-esteem*, and *goal orientation*, and such basic motives as the need for achievement and fear of failure (McClelland, 1985). The self-concept includes components such as feelings of self-determination and characteristic evaluations of self-worth. Trait self-efficacy is the general belief concerning the level of one's overall competence, regardless of the goal; and self-esteem is the affective, or 'feeling' component of self-evaluation. All of them have been shown to be related to setting higher goals and exhibiting greater (i.e., more beneficial) self-regulation of learning experiences (e.g., Chen, Gully, & Eden, 2004). Judge and Bono (2001) argue for a higher order factor they call *core-self-evaluations* that subsumes general self-efficacy and self-esteem together with locus of control and the Big Five factor model of emotional stability. Goal orientation of course refers to Dweck's (1986) notion of learning orientation versus performance orientation. To be learning-oriented is to be motivated by the opportunity to learn new things, no matter if they are difficult or easy. Expending effort to learn is rewarding, regardless of the level of final performance. In contrast, individuals who are performance-oriented seek a high level of final accomplishment. Having to expend high effort signals failure, and is to be avoided.

The touchstone of such motivational traits is that they are relatively stable and difficult to change. Consequently, an instructional program must accommodate the low scorers in some way, such as by trying to insure that the training goals are not too challenging and failure experiences are minimized. As with ability-based ATIs, the low scorers on such traits should respond positively to a more structured, guided experience. However, it is also the case that such traits may in fact also have 'state'-like properties (Latham, 2012), in which case training design can attempt to actually change learning orientation and self-efficacy.

Incentives

The effects of direct incentives on training motivation have not been studied extensively. What evidence does exist suggests that direct incentives do promote higher rates of training completion (e.g., Dierdorff & Surface, 2008). From a broader perspective, Cerasoli, Ford, and Nicklin (2014) meta-analyzed results of studies over a 40-year period and concluded that 'intrinsic motivation' (e.g., learning orientation) and extrinsic incentives/rewards jointly predict performance. That is, in our context, offering extrinsic incentives for training participation should not reduce the effects of trait learning orientation (i.e., intrinsic motivation).

State Motivation

In the training context, 'state' motivation refers to the determinants of trainee choices that are not stable characteristics of individuals but can exhibit within-person variability as a result of environmental, contextual, or learning factors. The states that have received the most research attention are: the cognitive judgments of expectancy, instrumentality, and valence incorporated in Vroom's (1964) VIE model; malleable judgments of self-efficacy, as defined by Bandura (2006); and the state forms of learning orientation and performance orientation specified by Dweck (1986) and Elliot and Fryer (2008).

For Vroom, expectancy is defined as someone's personal probability that they will achieve a particular level of performance if they expend a certain level of effort. Instrumentality is the perceived correlation between achieving a specific performance goal and receiving a particular outcome, and valence is the anticipated value of that outcome. For Bandura, state self-efficacy is the expected probability of doing well on particular training content at the time the learning experience starts. All of these cognitions have been shown to relate to choosing to start instructional programs and expending effort to finish them (cf. Latham, 2012; Diefendorff & Chandler, 2010; Colquitt et al., 2000). In the best of all worlds, two things should happen. First, training should be designed to yield high expectancy/self-efficacy, significant instrumentalities, and outcomes that are valued by the prospective trainee. Second, efforts should be made to insure that the trainee's self-efficacy, instrumentality, and valence judgments are accurate. It may also be possible to boost self-efficacy, instrumentality, and valence via pre-training experiences.

Some controversy has arisen over whether high self-efficacy is always good (Bandura, 2012;

Latham, 2012; Schmidt et al., 2012; Vancouver et al., 2014). A reasonable summary (we think) is that high self-efficacy could have deleterious effects if individuals severely overestimate their capabilities for succeeding in a particular training program, or if completing a training program is just one of several competing goals and effort is diverted to other goals because the individuals think completing the training program will be relatively easy. Consequently, training design and training implementation (organization managed or self-managed) should try to promote realistic self-efficacy judgments and avoid situations that include competing goals. Also, while self-efficacy may influence the choice to participate, Sitzmann and Yeo (2013) report a meta-analysis of longitudinal, within-person estimates of the relationship between self-efficacy and performance. The results argue that performance predicts future self-efficacy, but self-efficacy does not predict future performance.

Much recent research (Latham, 2012) suggests that goal orientations have both trait and state properties. Again, there are two principal dimensions, variously labeled learning (or mastery) orientation and performance (or outcome) orientation, each of which can be defined experimentally or psychometrically. Dweck (1986) began studying goal orientation in laboratory settings with school children and goal orientation was in fact manipulated. Subsequent research in adult training situations has taken an individual differences approach. In this context, it is hypothesized that high scorers on mastery orientation are rewarded by, and interested in, the effort they put into the learning process. They see training as an opportunity to learn something and learning is reinforcing, even if it is difficult and filled with mistakes. They like the mastery process itself. In contrast, high scorers on performance orientation are rewarded by external recognition for achieving the end-of-course objectives. If the mastery process is effortful and the learner is likely to make errors, it is a punishing experience for the performance-orientated, and to be avoided. Mastery-oriented people tend to believe that abilities and skills are malleable and they gravitate toward new training experiences. Performance-oriented people tend to view abilities and skills as difficult to change and they gravitate toward the familiar. Low self-efficacy should really not deter the learning-oriented from starting training while it could give pause to the performance-oriented.

The basic tenets of goal orientation are similar to the distinctions between a pessimistic orientation and an optimistic orientation made by what has come to be known as 'positive' psychology (e.g., Seligman, 1998; Seligman &

Csikszentmihalyi, 2000). That is, pessimists see obstacles and setbacks as failure on their part, and are to be avoided. In contrast, optimists view setbacks as challenges that can be overcome, and devoting effort to such challenges is rewarding. Migration from pessimism to optimism via training interventions is possible (e.g., Millman & Latham, 2001). Within positive psychology, pessimism versus optimism can be assessed via the Attribution Style Questionnaire (Peterson et al., 1982).

Within work and organizational psychology several attempts have been made to measure goal orientation via self-reports (e.g., Buttom, Mathieu, & Zajac, 1996; Colquitt & Simmering, 1998; VandeWalle, 1997) and to predict training motivation and achievement. Conceptually, in occupational training contexts, mastery orientation should be much more adaptive than performance orientation, and that has been the general result (Ford et al., 1998; Klein, Noe, & Wang, 2006; Latham, 2012; Latham & Brown, 2006). Questions remain however about the construct validity of the current measures, their dimensionality, the degree to which goal orientations are themselves malleable and can be changed (Ames, 1992; Stevens & Gist, 1997), and the domain specificity of mastery versus performance orientation. That is, are individual goal orientations different for different domains of content (e.g., math skills versus communication skills) or are performance orientation and mastery orientation both unidimensional? The former seems more likely but research has not yet engaged this issue. When thought of as a stable trait, performance orientation appears to be composed of two sub-factors, performance-positive and performance-avoid (VandeWalle, 1997), which bear a close resemblance to the need for achievement and the fear of failure as specified by McClelland. Performance-avoid tends to have a negative relationship with training achievement while performance-positive has a negligible correlation. Learning (mastery) orientation has a positive correlation. The three-factor structure of goal orientation was reaffirmed by Zweig and Webster (2004), and currently seems to be the solution of choice.

Consistent with the current factor structure, Harackiewicz et al. (2002) showed that it is indeed possible for an individual to pursue both learning and performance-positive goals at the same time. Interestingly, for state goal orientation, Beck and Schmidt (2013) showed that under time pressure, individuals can switch from a learning orientation to a performance-avoid orientation if the consequences of not meeting the performance goal are serious enough.

Context Effects

In addition to the motivational antecedents discussed above, there obviously are numerous context effects that can influence the choice to start and complete training. Time availability is certainly one. Others that are frequently mentioned are the individuals' past experiences with training attempts (positive or negative) and the degree to which the prospective trainees perceive that the organization is supportive of their training participation (Hurtz & Williams, 2009). Management support is critical, just as it is for everything else. However, to some degree, management support and the applicability of transferring what is learned may be culture specific (Wang & Wang, 2006).

Summary Statement

The trainee's motivation to (a) start a training experience, (b) expend effort to achieve the training objectives, and (c) finish the course is truly the 1000kg (2200lb) gorilla. Without motivation nothing else matters very much. The relevant literature suggests that people will start a training experience (self-managed or organization managed) to the extent that their self-efficacy/expectancies are perceived to be high enough, the training content is perceived to be instrumented for obtaining valued outcomes, the anticipated outcomes are valuable 'enough', and it is perceived that completing the course will indeed result in the valued outcomes. A number of individual traits and properties of the context could interact with these judgments (e.g., trait goal orientation, time demands, co-worker support). Learning goals should take precedence over performance goals, and state learning orientation could be fostered. Training should be designed accordingly. A summary of fruitful directions to pursue in the twenty-first century regarding motivation at work is given by Locke and Latham (2004). Two examples are learning more about the trait versus state characteristics of dispositions and the role of subconscious motivation.

EVALUATIONS OF TRAINING EFFECTS

Based on the framework used in this chapter, what we would like to know about training effects are the answers to questions such as (1) to what extent did the trainees acquire the capabilities specified by the objectives, (2) to what extent were the capabilities retained over time, (3) to what extent did the

learned capabilities transfer to the work setting, and (4) if the specified capabilities were not mastered, or retained, or transferred, why not? Was it because of flawed objectives, inappropriate training content, faulty instructional methods and conditions, unanticipated constraints in the training system, motivational constraints on trainee choice behavior; or deficiencies in prerequisite abilities, knowledge and skills, or dispositional traits?

Historically, what the training evaluation literature provides are evaluations of whether training (versus no training) produced change in end-of-course criterion variables, or whether a specific new training method (e.g., e-learning) produced better specific results than 'conventional' methods. It would be much more helpful to summarize research around specific substantive training problems and attempt to specify the optimal training content, instructional methods, learning conditions, and trainee prerequisite characteristics for achieving and retaining the desired capabilities. To a certain extent, this has begun to happen during the past 20 years, but the data are far from definitive. However, the bulk of the training evaluation literature is concerned with whether or not 'training' resulted in improvements in one or more criterion variables.

The most comprehensive such review is still the meta-analysis conducted by Carlson (1997). Studies were included if they (a) dealt with occupationally relative training for normal adults, (b) included one or more actual training interventions, (c) used a control group or both pre- and post-measures, and (d) permitted the computation of effect sizes. A comprehensive search going back to circa 1940, yielded 167 studies (42 unpublished) and 574 effect sizes of various kinds. Studies were categorized by decade and the 1970s emerged as the high-water mark for relatively well-controlled training evaluations (70 of the 167). Studies were coded on various moderator variables including type of experimental design, type of criterion measure, the length of time between the conclusion of training and the measurement of training effects, and by the general type of 'instructional' strategy that was used. Unfortunately, they were not coded by substantive differences in training objectives (e.g., training managerial problem solving, interpersonal skills, electronic troubleshooting).

Across all studies, the corrected grand mean for the difference between experimental and control and pre- and post-measures over all conditions is 1.03 standard deviations. When studies are grouped by type of criterion, the mean effect sizes range from 1.78SDs for knowledge-based measures to 1.14 for skills-based measures to .52 for 'outcome' measures. The third category refers to job performance-based measures that are not directly parallel to the training objectives (e.g., supervisor

ratings of job performance). For criteria categorized as attitudinal (e.g., expressed commitment to the organization), the mean effect size was .43. Studies were also classified into those which used an end-of-training measure and those for which the criterion measure was obtained sometime after training was concluded. The effective sizes for immediate versus delayed criterion assessment were 1.18 and .76 respectively. While there was considerable variability in the delay period and no information is provided about whether the delayed measure represents transfer or simply retention, the relatively small difference between immediate and delayed effects is reassuring.

The general picture from Carlson's meta-analysis is that training indeed has large effects, on the average, but results are also characterized by considerable variability about the mean, even after corrections for artifacts. Unfortunately, because such variables were not coded, it is not possible to account for this variability via the elements of training design, individual differences, organizational systems, or their interactions.

Other recent reviews are more narrow in scope. Arthur et al. (2003) categorized results by Kirkpatrick's four kinds of criteria (i.e., reactions, learning, behavior, and results). Somewhat strangely, the mean effect sizes over the four criterion types were virtually the same and ranged from .60 to .63. However, when broken down by the types of learning criteria, the results tended to mirror those of Carlson.

A general review of a kind that should be emulated much more is reported by Burke et al. (2006). The domain was employee safety and health training. Most of the studies were carried out by investigators in public health disciplines, not work and organizational psychology or organizational behavior. There were 95 studies ($n=20,991$) and results were classified by type of criterion measure (knowledge gain, skill gain, and performance outcome improvement), and by the level of trainee 'engagement' required by the training method(s). What the authors called 'level of engagement' we would call level of required effortful processing. The training methods ranged from lectures and online information presentation, to behavior modeling with feedback, to 'hands-on' practice in the job setting. Overall, all methods produced significant (substantive not statistical) improvement in knowledge, performance, and outcomes. However, the greater the level of effortful processing (i.e., engagement) required by the training method, the greater the magnitude of the gains. The authors comment, negatively, on the increasing reliance on computer-based methods that are simply information presentation methods that do not engage the learner.

Reinforcing the Burke et al. conclusions, Sitzmann et al. (2006) and Landers (2009) conducted meta-analyses of comparisons of internet-based versus classroom-based instruction and both reviews showed essentially no difference. Most likely, this is because the generic instructional method for both is simply information presentation, and the specific medium of presentation has little effect. However, there was frequently a third condition called 'blended' instruction, which did yield greater effect sizes. Blended refers to supplementing classroom instruction with a computerized or internet-based component which often included problem sets, worked examples, or structured discussions. Consequently, the blended courses required more effortful processing by the students/trainees. Again, it is not the medium of presentation, but the goal-relevant effortful processing that is critical.

An even more specialized review is provided by Keith and Frese (2008) who conducted a meta-analysis of error management training, compared to conventional classroom instruction, primarily with regard to teaching computer technology skills. Again, most likely due to more focused effortful processing, error management training was consistently superior, both in terms of end-of-course achievement and longer-term retention. This analysis begins to get at the kinds of evidence the training and development enterprise could use to great advantage. That is, for domain-specific, but still widely applicable, training objectives, what training content and training methods work best?

Reviews of evaluation studies directed at specific domains, such as leadership and management, problem solving and decision making, self-regulation, interpersonal skills, team training, and expatriate cross-cultured training will be discussed in later sections.

Summary

One conclusion from the above general review is that training really does work. Unfortunately, the evidence cannot be organized around what training content and which instructional methods are best for specific training objectives. Burke et al. (2006) is an exception. We will revisit this issue when considering training and development for the so-called 'twenty-first-century skills'.

Finally, we did not explicitly address the issue of summative versus formative evaluation. The above discussion deals primarily with summative evaluations. That is, did the training efforts accomplish the training objectives. A formative

evaluation would ask, specifically, how a particular training program could be improved (or why it failed). For us, that would mean asking: (a) whether the training design universals were each addressed thoroughly; (b) were the learning conditions optimal, including trainee motivation, given the training content and instructional methods, and (c) did the critical aspects of the context (e.g., time constraints, instructor expertise, management support) facilitate the implementation of the training experiences.

TRANSFER OF TRAINING

At this point, three questions arise, that are sometimes confused. First, did the training program meet the training objectives? That is, given the capabilities specified by the objectives (see Table 19.1), did the trainees exhibit them at the conclusion of training, and to what degree? The literature cited in the previous section strongly suggests that training can indeed increase individual capabilities. Second, did the trainees retain what they had learned over some period of time? Yes, individuals often do retain what they have learned, as a function of goals, motivation, effortful processing, and appropriate practice and feedback. The first question asks whether the right stuff got into long-term memory and was there when the course ended: The second question asks whether the right stuff stayed in LTM over some post-training time interval. The usual implication is that both learning and retention are assessed using the same, or very similar, measures (e.g., performance on a test or simulator). If learning has taken place, and has been retained, the third question asks whether the capabilities that were learned and retained are put to use in the actual work setting. In general, this is the issue of training transfer. However, the question of whether training transfers is very complex. The traditional definition of transfer pertains to whether what was learned in the training context can also be demonstrated outside the training context, on criterion measures that are similar to, but not identical with, the criteria used to assess end-of-course learning. For occupational training, this is a very narrow construal of transfer and seems virtually synonymous with retention. Unfortunately, the occupational training literature presents a number of different meanings for transfer. Consider just the following, keeping in mind that the overall purpose of occupation-related training is to enhance certain designated *determinants* of job performance.

- Will the capabilities learned in training be used to enhance performance on the performance factors that were the original source of the training needs?
- Will the capabilities learned in training be used to enhance performance on the performance factors that are related to, but not the same as, the performance factors that were the original source of training needs (e.g., supervisory performance versus team member performance)?
- Will the capabilities learned in training enhance performance in a new job or on a different set of performance requirements (e.g., customer service versus peer leadership) that are thought to require the same capabilities (e.g., interpersonal skills)?
- Will mastery of knowledge capabilities enhance performance in job situations that require a skill capability?
- Will mastery of knowledge and/or skill capabilities enhance performance in job situations that require a problem solving capability?
- Will the learned capabilities lead to increases in work group or organizational performance?

These various interpretations of transfer are obviously not the same, and while all may be legitimate, using the same term for all of them creates some confusion. Notice that we have not used such terms as ‘adaptive’ transfer, ‘horizontal versus vertical’ transfer, or ‘near versus far’ transfer. We think these distinctions are included in the above alternatives, but they carry a bit too much surplus meaning for our purposes.

Keeping in mind that training is intended to enhance the direct determinants of one or more components of job performance, we will restrict the term transfer to mean the use of capabilities acquired in training as a means to achieve higher performance on specified performance factors in the actual job setting. This would include performance factors that are the direct source of the training needs, as well as performance factors which share the same determinants. Consequently, for example, the term would not be used to describe the generalization of mastery of one task to performance on another when both are assessed in the training environment, or to the covariation between capabilities mastered in training and the organization’s bottom-line effectiveness (e.g., ROI). Again, both are legitimate issues, but lumping all under one collective label makes it too difficult for both researchers and practitioners to ‘mean the same thing’.

There have been a number of reviews of the transfer literature (Baldwin & Ford, 1988; Baldwin, Ford, & Blume, 2009; Bhatti & Kaur, 2010; Blume et al., 2010; Burke & Hutchins, 2007, 2008; Cheng & Hampson, 2008; Cheng & Ho, 2001; Ford &

Weissbein, 1997; Grossman & Salas, 2011). The primary focus has been on the conditions that facilitate transfer. However, research has been hampered by the criterion problem. That is, how is transfer to be assessed? For example, in the widely cited Baldwin and Ford (1988) review of the individual, organizational, and training design determinants of transfer, the most frequent criterion was retention over some period of time, not transfer as defined above. That is, the end-of-course measure, or one very similar, was simply administered again at some later time. Alternatively, transfer has sometimes been assessed via self-reports, or in a small subset of studies, by supervisor reports, that simply respond to general survey questions about whether transfer was observed. Apparently, only two individual studies in any of the above meta-analytic or narrative reviews (see Baldwin et al., 2009) attempted to assess whether the specific capabilities mastered in training were actually used in the work setting to enhance performance on critical performance requirements. Recent exceptions to this generalization are presented by Yelon, Ford, and Golden (2013) and Yelon, Ford, and Bhatia (2014). Physicians who had participated in patient care training, or training in how to teach medical residents, were asked sometime later, in interviews, how they went about these tasks. Their responses were very much in line with the objectives of the training programs. These two papers raise the issue of whether training designs should include specifications for how what's learned in training should actually be used in the transfer setting. A meta-analysis of 93 studies evaluating the effects of specific skills training for medical teams that seemed to incorporate this feature is reported by Hughes et al. (2016). Transfer was reported by observers or noted in records of specific mistakes. The transfer effects were relatively large and consistent. In sum, after discounting the questionable construct validity of self-reported transfer and the frequent conflating of transfer with retention, the reviews and subsequent studies cited above do seem to agree that transfer does in fact occur. There is also considerable mythology surrounding the extent to which it occurs (Ford, Yelon, & Billington, 2011). Estimates of the actual extent of transfer for particular knowledges, skills, problem solving capabilities, or attitudes/dispositions when trained via particular methods do not exist, and perhaps cannot, given all the possible moderator variables.

However, there are a number of very distinct reasons why the capabilities learned in training might fail to transfer. Consider just the following:

- The trainees simply might not acquire the desired capabilities by the end of training or at least not to the necessary level. Consequently, it is

important to know whether the training objectives were met, which is the focus of most training evaluation research. It is also possible that trainees acquired knowledge, skills, or attitudes that were not part of the training design (Klein & Ralls, 1997). These may transfer in unknown or perhaps undesired ways (e.g., as a result of their training experience, trainees concluded that management regards them as just low-level cogs in a high-tech system).

- Even though the intended capabilities were acquired, they are not retained or maintained in LTM for any appreciable length of time. Since retention is necessary for transfer to take place, the issue of what instructional methods best facilitate retention of the trainee capabilities is very critical. For example, for a broad range of capabilities the types of practice that maximize end-of-course mastery versus retention may be different (Schmidt & Bjork, 1992; Shute & Gawlick, 1995). The optimal feedback protocol may also be different (Carroll, 1997). As discussed previously, effortful processing that is directly relevant to the training objective, as in error management training (Keith & Frese, 2008), is the key to useful storage in LTM.
- If the intended capabilities are in fact mastered and retained, they still may not be transferred if the individual does not recognize the occasions that require them, as in knowing when a particular statistical concept is relevant (e.g., Lehman, Lempert, & Nisbett, 1988). Negative transfer could also occur, particularly for automatized or highly practiced skills, if highly developed domains of knowledge, skills, or patterns of choice behavior are wrongly utilized in situations that call for different capabilities. For many capabilities the occasions for their use may be obvious, but for others the issue of what instructional content and methods best facilitate such recognition is critical.
- If capabilities are mastered, retained, and the former trainee recognizes when, and where they are applicable, transfer may still not occur if the support, motivation, and rewards for using the capability are not sufficient (Bhatti et al., 2013a), or use of the capability is in fact punished by peers, supervisors, the management, or some other stakeholder. That is, there could be no motivation to transfer (Gegenfurtner et al., 2009; Grohmann, Beller, & Kauffeld, 2014). This is of course the focus of research on the transfer climate (Baldwin & Ford, 1988; Ford & Weissbein, 1997; Martin, 2010;

Rouiller & Goldstein, 1993; Tracey, Tannenbaum, & Kavanagh, 1995). For capabilities such as supervisory and management skills, it has been shown to be a powerful influence. Burke and Saks (2009) also suggest that the probability of transfer will be increased if both the trainees and their supervisors are held accountable for putting training to use. Finally, Curado, Henriques, and Ribeiro (2015) showed that making training mandatory rather than voluntary can depress the motivation to transfer.

- Related to the above is the situation in which there is no opportunity to use the learned capabilities, either for actual work flow reasons or because such opportunities are not granted to the trainee by the management (Ford et al., 1992).
- Even if the support and rewards for utilizing trained capabilities far outweigh the negative outcomes, and even if the relevant capabilities have been mastered, retained and the individuals fully understand when to use them, transfer may still not occur if the individuals choose not to use what they know because of low self-confidence or low self-efficacy (Eden & Aviram, 1993; Gist, 1997; Saks, 1995). Just as self-efficacy can influence the decision to participate in training, it can also attenuate transfer to the work setting if the individual lacks confidence about being able to successfully use what they have learned. Thus the training system must worry both about self-efficacy for completing the course and self-efficacy for using what's learned back in the job setting (Gist, 1997).
- Even if the intended capabilities have been retained, the organization supports their use, and individual self-efficacy is fine, individuals could choose not to use the learned capabilities because they believe it would not help their performance. That is, they do not accept the validity of the training objectives (Bhatti & Kaur, 2010). This might happen more often than we would like in leadership training or diversity training.
- Finally, *useful* transfer will not occur if in fact the trained capabilities are not relevant determinants of critical performance factors. Sometimes the training content and instructional methods are blamed for what are really mistakes in work design or needs analysis.

If there are multiple distinct reasons for a failure to transfer then there must be multiple distinct remedies. It is a complex issue that is not well represented by the traditional experimental literature

on learning and skill acquisition. However, given the current literature in HRD, I-O Psychology, and Organizational Behavior, Grossman and Salas (2011) and Burke and Hutchins (2007) have summarized the factors that have the most research support as determinants of transfer. A summary of their summary is as follows. The factors are grouped into the three categories originally proposed by Baldwin and Ford (1988): trainee characteristics; training design elements; and work environment (organizational) properties.

Trainee Characteristics

- Cognitive ability.
- Self-efficacy.
- Motivation to learn and to use what they learned.
- Perceived utility of training.

Training Design

- Effortful processing (our words, not theirs), as in error management training and behavior modeling simulations.
- 'Situating' training environments that resemble the workplace, or are actually in the workplace.
- Appropriate feedback and practice.

The Work Environment

- A supportive transfer climate, including peer and supervisory support.
- Opportunity to use the newly trained characteristics.
- Post-training follow up, such as refresher training, additional practice, and feedback.

What is missing from this list is a careful consideration of the validity of the needs analysis and usefulness of the capabilities to be learned, as they are specified by the training objectives and training content. The objectives specify what is to be transferred and the training content must incorporate them (see Bransford & Schwartz, 1999). For example, if the transfer objective is for individuals to be able to solve ill-structured problems in certain domains, then the training objectives should reflect it.

Finally, with the exception of the literature on medical team training, the weak link in the transfer literature is still the construct validity of the transfer assessment criteria. Self-reports or measures of retention are not very useful. Supervisor or peer observations of performance on the *specific* performance requirements of interest are more appropriate. Even more useful would be simulations

that mimic the workplace environment, or post-training cognitive task analyses that attempt to determine whether the goals, knowledge and skill resources, and work strategies individuals use have changed and whether the changes are commensurate with the training objectives. A very old study (Bunker, 1965) dealing with the transfer of knowledge and skills learned in sensitivity training (also known as T-group training) asked peers (of both experimental and control group participants) to generate critical incidents of the target person's performance. The critical incident writers were blind to whether the target was experimental or control. A much higher percentage of the incidents for the trained group were in line with the training objectives. Training transferred.

Summary

Transfer certainly can, and does, take place; however, it would be desirable if more construct valid indicators of transfer were used more often. The most useful research would be to determine the primary factors that prevent effective transfer, or promote it.

CURRENT AND FUTURE TRAINING NEEDS

Most observers (e.g., see Carnevale, Smith, & Strohl, 2010) argue that we are currently still in a period of great change, worldwide. Economies are becoming even more interdependent, developments in computing, biological, medical, energy, and financial technologies are virtually revolutionary in nature. During the last 15–20 years the economies of China, India, Malaysia, Brazil, and many African countries have grown rapidly. Innovation moves at a faster and faster pace, and organizations must be as knowledgeable and adaptable as possible. The volatility in the financial markets, such as the 'Great Recession' of 2008, and further volatility to come, complicates things even further. Education and training enterprises must struggle to deal with it all. It is reasonable to ask whether these events create training needs that are critical for broad sectors of the global economy. That is, while there are always specific technical training needs for specific occupations, that display widely varying levels of complexity, are there more general training needs that are critical for virtually all employment, in virtually all organizations, and in virtually all cultures and economic systems? The prevailing opinions in the current training and development literature seem to be that there are; see for example,

National Research Council (2012), Ashton, Sung, and Turbin (2000), Haasler (2013), Griffin and Annulis (2013), and Sung et al. (2013). Such training needs have been somewhat crudely categorized into 'workforce readiness skills' and 'employability skills.' Similar sets of such skills have been noted by investigators in the US, the UK, Europe, and Asia. The distinctions between workforce readiness skills and employability skills (e.g., Miller, Biggart, & Newton, 2013) are not perfectly clear, but are something as follows.

Workforce Readiness Skills

These are capabilities that should be developed in the secondary school system and which are fundamental to all employment. The national educational systems that prepare individuals for work roles vary widely across countries (Ashton et al., 2000). However, economic globalization will continue to make skill demands more similar across nations. What capabilities, that are amenable to training, are high priority needs for new entrants to the modern workforce? Hamilton and Tarraco (2013) point to evidence suggesting that current math, reading, and writing literacy are *below* the eighth grade level for *over 40 percent* of the current US workforce, and getting worse. Autor, Levy, and Murnane (2003) note that basic computer skills will become a requirement for virtually all jobs. In general, the work-readiness skills most often mentioned are:

- Basic math or numeracy skills
- Literacy and reading comprehension
- Basic written and oral communication skills
- Basic information technology skills
- Metacognitive skills, loosely defined 'thinking about thinking', or reflecting on what your goals should be, deciding how best to pursue them, monitoring progress, evaluating whether or not you should change the way you are doing things, or how you should think about things. We will talk about such skills in the context of self-regulation and self-managed instruction.

In general, the prevailing view is that the current levels of these skills are too low.

Employability Skills

Employability skills are defined (e.g., see Miller et al., 2013) as skills that could be acquired in a variety of post-secondary training venues, through

either formal training or informal learning. They are the general skills that promote successful performance in a work role, lead to advancement and progression over significant periods of time, and underlie innovation, job redesign, and job crafting. Employability skills are meant to be transportable from job to job and across different settings. They are viewed as necessary for an individual to successfully move between organizations, adapt to performance requirement changes, and deal with the rapid changes that characterize the twenty-first-century global economy.

The 'skills' most often mentioned in this domain seem to be the following:

- Interpersonal skills involved in leadership (peer or supervisory) and teamwork.
- Teamwork skills enabling collaborative and coordinated effort in teams.
- Self-regulation (i.e., self-management) of performance in general, and self-managed instruction in particular. As portrayed in the literature the overlap between self-regulation skill and metacognitive skill is not perfectly clear, in our opinion. We take metacognitive skills to be a subset of self-regulation skills.
- Problem solving, which refers to the ability to recognize and define problems, generate potential solutions, evaluate solutions, and implement high quality solutions.
- Critical thinking which refers to *either* the *ability* to evaluate causal assertions, evaluate alternative courses of action, and identify errors in decisions, *or* the *disposition* to always question the assertions, proposed actions, and decisions proposed by others.
- General customer service skills that include being able to deal effectively with the needs, requests, or demands of customers, clients, or colleagues.
- Entrepreneurship skills defined as the ability to evaluate one's own work situation and see options and opportunities for how to achieve an expanded set of goals. It is similar to entrepreneurship but relevant to the individual domain and not the organization context, although generalization is possible (Boon, Van der Klink, & Janssen, 2013; Karimi et al., 2011).
- Some (e.g., Griffin & Annulis, 2013; G. Wang, Rothwell, & Sun, 2009) also argue that in many developing economies, basic skills in leadership and management are still in short supply, across virtually all employment sectors. Additionally, even in highly developed countries, what are the general leadership/management skills that will

be required to deal with rapidly changing organizational goals, technological developments, and competitive pressures?

- Important non-cognitive 'skills' that pertain to attitudinal or dispositional choice behavior capabilities, and include variables such as being conscientious and responsible, and showing motivation and goal commitment.
- Finally, it is still the case that at virtually all levels in organizations, people are crossing international boundaries to fill jobs. This situation varies from organizations hiring foreign nationals to fill positions that cannot be filled by the host country labor force, to global organizations sending their own employees to fill positions in their international operations. These are two very different kinds of expatriates. Do they have common training needs? Are there critical training needs that are unique to each? Are there general *expatriate skills*?

The match between current research and development and this set of critical training issues is very uneven. We will try to summarize where research is attempting to address these issues and where it is not. The emphasis here is on the research literature and not on the sheer availability or description of training programs that purport to address each of these training needs.

Although some authors try to side-step them (we won't mention names), consideration of any one of these employability skills must address three basic questions. First, is there a reasonable substantive specification for what is meant by a particular employability skill (e.g., problem solving)? Second, is there a prescription for how to train such a skill? Third, assuming there is a training prescription, does it succeed in imparting the skill to individuals such that it can be transferred to the work setting?

All three questions have been answered for only a few of the above named skills, and they are discussed in later sections. In general, the skills listed above were not identified via a formal needs analysis. They have resulted from the expert judgment of people working in the training and development field, which does not negate their importance, particularly since there is so much similarity, world-wide, in the 'lists'.

The term 'skills gap' seems to refer not to general employability skills as listed above, but to either some of the more basic work-readiness skills, or to more specific technical skills required by particular jobs or professions. Whether or not there are such skills gaps will be addressed in the epilogue to this chapter.

INTERPERSONAL SKILLS TRAINING: AN EXAMPLE OF OBJECTIVE-CENTERED EVALUATION RESEARCH

An example of a research stream that deserves more emulation pertains to instruction in the interpersonal skills relevant for peer leadership, team member performance, and supervisory performance. One major milestone was the development, by Goldstein and Sorcher (1974) of a modeling/role play/feedback-based program to teach specific interpersonal skills to supervisors of the so-called 'hard to employ'. The program appeared to reduce turnover and absenteeism to a considerable degree, which led to more widespread use of this kind of program and to a broad range of research efforts (Decker & Nathan, 1985; Kraut, 1976; Latham & Saari, 1979). In general, when well-defined learning objectives, well-constructed model videotapes, and a variety of role-playing practice and feedback opportunities are provided to trainees the program will produce significant gains in specific interpersonal skills that are retained and transferred to the work setting. For example, Latham and Saari (1979) facilitated transfer by also training the managers of the trainees and by asking the trainees to try out their newly trained skills back in their work setting and to bring their experiences back to the training sessions for further examination, or as it is called now, 'after-action-review.'

Subsequently, other investigators have evaluated the effects of trainer versus trainee produced training objectives (Hogan, Hakel, & Decker, 1986), additional cognitive rehearsal (Decker, 1982), modeling both positive and negative examples of the skill capabilities (Baldwin, 1992), and the incremental value of supplemental training in goal setting versus training in self-management skill (Gist, Bavetta, & Stevens, 1990; Stevens & Gist, 1997). More recently, May and Kahnweiler (2000) evaluated the incremental effects of additional mastery practice in which each trainee was given intensive one-on-one skills practice with the trainer. Mastery practice improved skill retention but did not increase transfer as assessed by 360 feedback techniques. Subsequent interviews suggested that during the transfer measurement period there were actually few opportunities to use the new skills. The results also suggested that the training time and effort needed to master such skills may be seriously underestimated. Many trainees did not achieve the desired level of demonstrable skill by the end of the training, and even for those who had the additional 'mastery practice' there was considerable skill loss over a period of just a few weeks. Such findings contrast sharply with the constant pressure to shorten training time, reduce training costs, and

constrain instructional methods to those that are deliverable on-line.

A more recent meta-analysis of 117 studies of behavior modeling training directed at increasing interpersonal skills (Taylor, Russ-Eft, & Chan, 2005) showed consistently positive results. Interestingly, retention is greater for the skills themselves than for their declarative knowledge base. Transfer was greater when both positive and negative models were used, trainees generated some of the role-playing scenarios, and the trainees' supervisors were also trained.

A brief but reasonable summary of the total research record might be that (a) these are difficult skills that probably require more practice than is generally acknowledged, (b) intense one-on-one guided practice from an expert, mental rehearsal, and frequent classroom role play sessions are all valuable, (c) increasing effortful processing by asking trainees to infer the objectives from the model's performance and asking trainees to report on their attempt to use their new skills back at work, improve retention and transfer, and (d) variation in models in terms of their levels of proficiency, the content of the scenarios, and the context in which they take place are beneficial for retention and transfer. This body of research also demonstrated that such complex skills have both malleable (i.e., trainable) and trait-like components (e.g., the characteristic level of introversion/extroversion) which to some degree constrain the efficacy of a training solution (May & Kahnweiler, 2000). The trainable components may also include both skills that are potentially automatizeable (e.g., never becoming defensive when criticized) and those which are not (e.g., using negotiating strategies that are optimal for the occasion). Gelfand and Dyer (2000) have also demonstrated the cultural relativity of certain interpersonal skills.

Summary

In general, using interpersonal skills training as a model, the field of training would benefit a great deal if more (much more) research focused on how best to achieve particular substantive training objectives that are judged to be broadly important and critical.

TEAM TRAINING

We said in 2001, that the previous 10–20 years had seen a surge of attention focused on team phenomena. That surge has continued and the literature on

teams has expanded at an even greater rate, both in breadth and depth (e.g., see Cannon-Bowers & Bowers, 2010; Ilgen et al., 2005; Kozlowski & Salas, 2010; Kozlowski & Ilgen, 2006; Mathieu et al., 2008; Salas et al., 2008; Salas, Weaver, & Shuffler, 2012; Stewart, 2006).

The specifications for what constitutes a team have also broadened. It now seems to include virtually any collection of people (in a work setting) that have at least some shared goals and who must interact, at least to some degree, to accomplish their goals. The team may or may not have a 'leader'. This breadth in definition excludes, perhaps, only those groups whose members do not interact and their performance is not influenced by other group members (e.g., call centers, certain kinds of accounting operations).

Given this broad specification, there are many different kinds of teams that have been the object of research. Consider just the following:

- There are a variety of *advisory groups/teams* that meet infrequently but have considerable responsibility for oversight of certain aspects of organizational functioning. Boards of directors, trustees, advisory boards, and review boards are examples. Selection is usually by invitation, the team members possess specific areas of expertise, the group may exist for a very short time (e.g., one meeting only) or a long time (e.g., a corporate board); and interactions are limited to information sharing, advice giving, and decision making.
- The *high performance work team* is perceived to be a critical element in the design of organizations that will be effective in the global economy. The high performance team, contrasted to the traditional work group, is characterized by a shared commitment to high performance goals, considerable cross-training, and team self-management in the sense that many of the leadership and management functions (work scheduling, goal setting, supporting other team members, performance monitoring, cost control, etc.) are the collective responsibility of the team. If this organizational form is of increasing importance, and evidence suggests that it is (National Research Council, 1999), then important questions concerning team training needs forcefully present themselves.

The high performance team concept is a direct descendent of the development of the autonomous work group at Volvo (Walton, 1985) and the study of sociotechnical work systems at Tavistock Institute by Trist and his colleagues (Pasmore et al., 1982; Trist & Bamforth, 1951). Historically,

the autonomous work group experiments at the Gaines pet food processing plant and the Rushton Coal Mine (Goodman, Devadas, & Hughson, 1988) illustrate some critical advantages and disadvantages of self-managed teams as they operate within a larger system.

Currently, there are several different kinds of high performance teams, such as highly skilled production teams in a modern manufacturing organization; service teams dealing with many different kinds of services (e.g., custodial, maintenance), research teams as found across many different disciplines, and technical decision making teams in a variety of production, service, or educational areas (e.g., surgical teams, investment teams).

Becoming more and more important in today's economy are *project teams* that come together, for a short time, or a long time, to accomplish a major task, or set of tasks, and that have a start point and an end point. R&D research teams, design teams, or construction teams are examples. A great deal of team training attention has been devoted to *crew teams* that have responsibility for the operation of specific equipment or systems, such as a commercial airliner or nuclear power plant control room. *Action teams* (e.g., fire fighters, law enforcement, sports teams) are groups that spend much of their time training or maintaining readiness, but must act as a coordinated team to achieve specific goals at certain specified times. *Management teams* can exist at multiple levels of an organization and exist primarily for oversight, problem solving, and decision making purposes. The variant receiving the most attention in the literature is the top management team (TMT).

These 'types' are illustrative of a number of parameters characterizing teams that are critical for team training design. First, the specific substantive goals the team is to pursue will have an important influence on team training needs and on who is selected for team membership. For example, a review board could be responsible for giving the best advice possible, or for making actual regulatory decisions. Second, the relative stability of team membership will influence the extent to which a group of individuals can, or should, be trained as an intact group. Third, the way in which the contributions of the individual group members are linked together will influence the determination of training needs and training design. Goodman, Lerch, and Mukhopadhyay (1994) described the major kinds of within-group linkages, varying from contributions being totally independent (e.g., each team member produces their own output without the need to rely on other team members) to teams in which the efforts of the individual members are sequential, to teams in which there is total interdependence among all team members in real time and a very high level of sustaining coordination is required.

Wildman et al. (2012) present an alternative classification of teams based on the major tasks they perform and their major team characteristics. It is similar to, but different from, the above classification, and a bit more abstract. Also, Tannenbaum et al. (2012) remind us that the state of teams in contemporary organizations is even more complex than described above. People may belong to multiple teams, there are many variations of each of the above 'types', team memberships can change haphazardly, and team interactions can vary from conventional face-to-face groups to all manner of 24/7 virtual environments. All of this complicates the training process, but perhaps heightens the importance of developing generic team knowledge, skills, and attitudes that are 'transportable'.

Analogous to individual training, the general objective of team training is to enhance the determinants of team performance; and we also make the same distinction between team performance itself and the outcomes of team performance (i.e., team effectiveness) that we made for individual performance and its outcomes. That is, for example, a team may perform very well but its outcomes could suffer if higher management screws up, other teams fail, or the economy goes into recession. The best existing portrayal of the components of team performance is still that of Hackman (1990) as elaborated by Kozlowski and Ilgen (2006). That is, there are three principal components of team performance: (1) the degree to which the team accomplishes the substantive goals assigned to it, either by its own members or by its management, (2) the degree to which the team provides a rewarding experience for its members such that they choose to remain committed to its goals, and (3) the degree to which the team makes improvements in its skills, resources, and procedures.

Given these three components, what then are the *trainable* determinants of team performance differences on these components. The literature on the 'trainable determinants' has expanded considerably since 2001.

TRAINABLE DETERMINANTS OF TEAM PERFORMANCE

We summarize here the *potential* trainable determinants that have been discussed in the literature. The degree of research support for the utility of training each of them is uneven (Salas et al., 2008). There are various ways of categorizing the individual determinants. One frequent categorization is the distinction between *task work* and *team work*. Another distinction is between *team processes* and *team emergent states* (Mathieu et al.,

2008). In the following section we attempt to provide a synthesis of such categorizations.

Individual Team Member Characteristics

Consideration of trainable determinants requires a multilevel view. That is, some refer to the characteristics of individual team members, some to the properties of the team as a group, and some that could be both. The following are properties of the individual.

The technical knowledge and skill of the individual group members

Technical is defined broadly. It could refer to surgical techniques, customer service skill, or physical skills. Cannon-Bowers and Salas (1998) make a distinction between knowledge and skill that is applicable across a range of teams (e.g., knowledge of software application), versus being highly specific to the work of a particular team. If the within-group skill requirements differ across team member roles then perhaps the greater the degree of cross-training the better.

Individual teamwork knowledge and skill

There have been numerous attempts to specify the domain of individual teamwork knowledge and skill. Olson (2000) reviewed these efforts and generated a synthesized set of specifications. She then collected several hundred critical incidents from team members in several organizations that used the high performance team design. The question for the participants was to describe examples of effective and ineffective individual teamwork performance. Different sets of expert panels were then used to either fit the critical incidents to the synthesized specification of team work skills, or to develop a set of teamwork dimensions independently by content analyzing the critical incidents without any reference to previous work. The result of combining these efforts yielded the revised taxonomy of individual teamwork performance dimensions shown in Table 19.3. The implication is that each of these components of an individual's contributions to teamwork is trainable, although they might be under varying degrees of motivational control as well (e.g., dimension one).

Interestingly, when held up against the model of work performance described by Campbell and Wiernik (2015), factors 1 and 2 represent the effort/initiative dimensions found in Organ's organizational citizenship model (Organ, Podsakoff, & Podsakoff, 2011), Borman and Motowildo's

contextual performance model (1997), and the Campbell et al. (1993) model. Factors 3–5 represent peer leadership dimensions, and factors 6–9 represent peer management, as characterized by Campbell and Wiernik (2015). The rationale for considering these factors as sub-factors of peer/team member leadership and management can be found in Campbell (2012).

TEAMWORK PROCESS CHARACTERISTICS

It is interesting to compare the Table 19.3 taxonomy of individual teamwork performance components to the widely cited taxonomy of team processes formulated by Marks, Mathieu, and Zaccaro (2001) on the basis of a thorough search of the team process literature. An abridged version is shown in Table 19.4. The corresponding factors from Table 19.3 are shown in parentheses.

The two taxonomies are very, very similar, except that the Olson factors are described as things *team members* do and the Marks et al. factors are things that *teams* do. Olson's factor 1 does not have an analog in the group process taxonomy and Marks et al.'s conflict management factor is not represented in the Olson taxonomy. However, all of the factors seem potentially trainable; from either an individual training or a team training perspective, and they overwhelmingly have to do with peer leadership and peer management. Consequently, the leadership and management development literatures are relevant. Also, there is a very strong implication that such skills can, and should, be trained both in the individual context and as a team. Again, the similarity in the taxonomies is remarkable, given that they came from three independent sources. A specific, but difficult, skill that did not appear in either of the taxonomies is self-regulation/metacognition, which could be viewed as both a property of individuals and a property of teams. It is a critical skill for virtually any work activity and we will discuss it at some length in the next section. A somewhat similar taxonomy is presented by Morgeson, DeRue, and Karam (2010), although it includes elements that might not be trainable.

TEAM EMERGENT STATES

This term is perhaps a bit too jargony for us, but the literature (e.g., Grossman, Spencer, & Salas, 2014; Kozlowski and Ilgen, 2006; Mathieu et al., 2008) points to a number of additional determinants of team performance that seem to 'emerge' over time

as a team matures, and which are potentially trainable. They are viewed as team characteristics, perhaps with analogs at the individual level. The principal emergent states seem to be the following.

Accurate and Shared Mental Models

For a team to function effectively, the members should have a common and accurate understanding of three principal features of the team: (1) the goals or objectives the team is pursuing, (2) the procedures that the team is to use to accomplish its goals, and (3) the capabilities and behavior tendencies of each group member. That is, the team member should have a shared accurate picture of what each team member can and cannot do.

Transactive Memory

This term refers to the awareness the team members have of each other's relevant technical knowledge, technical skills, goals, goal commitments, peer leadership/management skills, willingness to expend extra effort, etc. That is, a high level of awareness about what other team members know, can do, and will do, contributes to team performance.

Team Efficacy

This is the shared belief across team members that they have the competence to achieve the team's goals. It is analogous to individual self-efficacy and there could be both specific team efficacy beliefs pertaining to specific team goals, and general team efficacy reflecting an overall belief that the team will be successful no matter what it does do.

Perceived Empowerment

This pertains to the belief that the organization has given the team the freedom to act in whatever ways it deems best to accomplish the team's goals. It need not wait for management approval or direction for everything it tries to do.

Team Cohesion

The degree to which the team members are committed to the team's goals, feel that they must succeed together, feel responsible for each other, and do not act in their own self-interests if it hurts team performance.

Table 19.3 A taxonomy of components of individual performance as a team member (from Olson, 2000)**Effort and Initiative**

1. *Fulfilling Team-Related Task Responsibilities.* Takes ownership for and completes assigned tasks according to committed timelines. Demonstrates effort toward team goals. Does not pass work off to others or take shortcuts that compromise quality.
2. *Team Member Helping/Backup Relief.* Fills in or covers for team members who are overwhelmed or absent. Rearranges own schedule and demonstrates flexibility to help other team members. Puts in extra time and effort to help team members without being asked and without complaining. Does not engage in off-task activities when other team members could use help.

Peer Leadership

3. *Peer Leadership: Initiating Structure.* Helps to define goals and organize and prioritize tasks. Generates plans and strategies for task completion, identifies resources needed to meet team goals, and shares resources or guides team members to resources to help them complete their task.
4. *Peer Leadership: Consideration.* Provides social support and empathy, offers verbal encouragement, and acts respectfully toward other team members, especially when tasks or situations are difficult or demanding. Facilitates cohesion and effective working relationships between team members by acting honestly, communicating openly, and helping to manage or resolve conflicts. Does not embarrass team members in front of others, act impatiently, or blame others.
5. *Training Other Team Members/Sharing Task Information.* Shares information with team members, provides task explanations and demonstrations, answers questions, and gives timely and constructive feedback to team members. Does not withhold information about team-related tasks.

Peer Management

6. *Monitoring Performance.* Observes and is knowledgeable about the performance of other team members. Pays attention to what individual team members are doing. Evaluates progress of self and others and recognizes when team members may need help.
7. *Monitoring Team Effectiveness.* Pays attention to the team's situation, including relevant conditions, procedures, policies, resources, systems, equipment, technology, and level of team accomplishment. Notices and identifies team-relevant problems and obstacles.
8. *Individual Contributions to Problem Solving.* Helps in identifying alternative solutions, strategies, or options for dealing with problems, obstacles, or decisions. Helps in evaluating alternative courses of action, and takes preventive measures to avoid future problems.
9. *Individual Contributions to Workload Distribution/Coordination.* Contributes to and encourages discussion of work distribution, workload balance, potential workload problems, and the sequencing of team member activities. Coordinates own task activities with other team members. Does not make unnecessary requests or overload other team members.

Trust

Do the group members trust each other to cooperate, communicate openly, support the team's goals, back each other up, fill in when necessary, and not act totally in their own self-interest? The level of trust within the team is correlated with team performance. Can it be trained? Potentially, yes.

Situational Awareness (SA)

SA refers to being aware of *all* the cues in the team's environment that may have something to do with its task or teamwork responsibilities.

Group Process Loss

We should also not forget that in addition to the study of teams in organizations there have been

many decades of research on group dynamics and group performance in general, primarily in social psychology. A comprehensive and relatively recent review is provided by Kerr and Tindale (2004). Some of the most salient findings for team training are the following.

- *Process loss:* When compared either to individuals or to independent standards for what they should be able to do, groups suffer a certain amount of 'process loss'. That is, they do not perform as well as they should given the knowledges and skills of the individual members (e.g., Campbell, 1968). Four principal reasons for process loss have been identified: (1) in a face-to-face context, 'blocking' of individual contributions occurs because everyone cannot talk at once, talkative people have more influence (but not better ideas), and individuals cannot sustain their train of thought;

Table 19.4 A taxonomy of team processes (from Marks et al., 2001)

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- 1) **Team monitoring and backup behavior.** Assisting team members to perform their tasks. Assistance may occur by (1) providing a teammate verbal feedback or coaching, (2) helping a teammate behaviorally in carrying out actions, or (3) assuming and completing a task for a teammate. (2)
 - 2) **Motivation and confidence building.** Generating and preserving a sense of collective confidence, motivation, and task-based cohesion with regard to mission accomplishment. (4)
 - 3) **Goal specification.** Identification and prioritization of goals and subgoals for mission accomplishment. (3)
 - 4) **Affect management.** Regulating member emotions during mission accomplishment, including (but not limited to) social cohesion, frustration, and excitement. (4)
 - 5) **Conflict management.** Preemptive conflict management involves establishing conditions to prevent, control, or guide team conflict before it occurs. Reactive conflict management involves working through task and interpersonal disagreements among team members. (None)
 - 6) **Monitoring progress toward goals.** Tracking progress toward mission accomplishment, interpreting system information in terms of what needs to be accomplished for goal attainment, and transmitting progress to team members. (6)
 - 7) **Mission analysis and planning.** Interpretation and evaluation of the team's mission, including identification of its main tasks as well as the team resources available for mission execution. (7)
 - 8) **Systems monitoring.** Tracking team resources and environmental conditions as they relate to mission accomplishment. (7)
 - 9) **Strategy formulation.** Development of alternative courses of action for mission accomplishment. (8)
 - 10) **Coordination.** Orchestrating the sequence and timing of interdependent actions. (9)
-

(2) individual team members can suffer from various degrees of 'evaluation apprehension' and are reluctant to share their knowledge and ideas for fear of being judged negatively, (3) collectively the group sets goals that are too low, and (4) a certain amount of 'social loafing' occurs and some group members do not contribute as much as they should. The training remedy for process loss would seem to be in the enhancement of the peer leadership and management skills discussed in the Olson and Marks et al. taxonomies with special reference to counteracting the reasons for process loss.

- **Stress:** Although a certain amount can be beneficial, group (i.e., team) performance suffers under excessive stress. Research has shown that building ever increasing amounts of stress gradually into training exercises can reduce the performance decrements.
- **Unshared knowledge:** Although shared mental models and transactive memory may be at high levels, there is virtually always a certain amount of unshared knowledge and skill that are unique to individual group/team members. An effective group/team should routinely check for and elicit these unshared resources.
- **'Group-think':** Under certain conditions a kind of 'group-think' can occur which degrades group/team's performance. The group/team must frequently initiate external performance review.

Summary

A summary of potentially trainable determinants of team performance is as portrayed below.

<i>Trained Individually</i>	<i>Trained as a Team</i>
Individual technical knowledge and skill	Team backup efforts
Situational awareness	Team leadership processes
Individual initiative and effort	Team emergent states
Peer leadership skills	Team situational awareness.

Team leadership and management processes perhaps deserve special comment. Crawford and LePine (2013) point out that teams could be large or small, there may be sub-teams, and the amount of, or opportunity for, interaction can vary across time. Consequently the peer leadership and management contributions of the individual team members, at least for some dimensions, may need to be coordinated or integrated. The team must learn effective ways of doing that, just as the members learn to coordinate their technical contributions.

Obviously there are other determinants of team performance, such as the ability and personality characteristics of the team members, the degree to which it receives management support, the available technology, and the 'composition' of the team viewed from a number of parameters (Mathieu et al., 2013). Our emphasis here is on the trainable determinants. However, it may also be the

case that individual abilities, personality traits, and composition parameters have both interactive and/or main effects on the efficacy with which training can enhance the determinants listed above. To the best of our knowledge, there have been no attempts to model the joint effects of such individual or team differences and specific training methods for achieving mastery of the trainable capabilities.

TEAM TRAINING METHODS

The team training literature has a tendency to confuse the content of a training program and the methods used to teach it. The potential content of team training is as presented in the previous sections. The generic methods that could be used to teach this content are represented in Table 19.2. Virtually all of them could be used to train individuals or to train the intact team. However, the critical requirement for a training method is again that it requires effortful processing on the part of the individual and/or team that is directed toward mastering the content that must be learned to meet the training objectives.

The specific brand name methods that are mentioned most often are cross-training, crew resource management training (CRM), and specific simulations of crew environments (e.g., LOFT). For a full discussion see Grossman et al. (2014). Cross-training involves teaching team members the knowledge and skill requirements for multiple team member roles, and could employ any of the several methods listed in Table 19.2. CRM is often used to train effective crew leadership and management to aircraft, weapons systems, and technical service crews. The evolution of CRM for commercial airline crews is described by Helmreich, Merritt, and Wilhelm (1999). Its further development for application to a wider variety of crews is documented in Kanki, Helmreich, and Anca (2010). It is an interesting story. Much of the development of these methods was driven by analyses of aircraft accidents and the finding that accidents were often precipitated by factors such as faulty communications among crew members, very hierarchical crew structures which made crew members reluctant to challenge or question the leader (captain), failure to distribute workloads effectively, or lack of coordination in the problem solving process during emergencies (Foushee, 1984; Orasanu, 1993). The training response by both the military and commercial sectors has been extensive (Kanki et al., 2010; Salas et al., 2008; Wiener, Kanki, & Helmreich, 1993). Much of the training content for CRM deals with capabilities related to the individual teamwork skills discussed above. Instruction methods used to convey

this content involve information presentation via reading materials, lectures, videotape demonstrations, small group discussions, and individual skill training via role-playing (Helmreich et al., 1999).

Commercial aviation training efforts also include simulation methods. For example, intact crews are placed in the simulator referred to as Line Oriented Flight Training (LOFT) and asked to fly a complete trip segment (Butler, 1993). The crew must do all the usual tasks but each training session also incorporates unusual or emergency events with which the crew must deal in a coordinated well-managed way. That is, the training content used with these methods often involves appropriate responding to critical emergency events.

The after-action-review, or post-event (simulated or actual) debrief, also qualifies as a specific team training method. It has always been used extensively in the military, but is seeing increasing use in the private sector (Villado & Arthur, 2013).

EVALUATION OF TEAM TRAINING EFFECTS

In 2001, we remarked that research focused on the effects of team training was relatively sparse, and confined largely to team training for military and commercial aircraft crews, including the CRM and LOFT training programs operated by the individual airline companies. More recently, the evaluation research base has expanded somewhat. Various parts of it are reviewed by Hughes et al. (2016), O'Connor, Flin, and Fletcher (2002), Salas et al. (2008), and Tannenbaum and Cerasoli (2013). The Salas et al. (2008) meta-analysis included 93 effect size estimates distributed as follows across settings: lab/university (37), military (39), business (5), commercial aviation (6), and medical teams (6). Consequently, the empirical record is larger than it was, but still sparse; and the predominant kind of team is still the 2–3 person military, aviation, or laboratory simulator crew. There were only five estimates using teams from business settings and the total number of teams included in the 5 estimates was 10. Consequently there has been virtually no team training evaluation research dealing with high performance work teams in production, R&D, technical, or service contexts, or with project teams or action teams of various kinds.

However, narrow though they might be, the meta-analytic results reported by Salas et al. (2008) are generally positive. The effect sizes, expressed as the corrected correlation between the outcome measure and treatment group membership (i.e., trained versus not trained) ranged between .30 and .50, for

the most part. Training focused on what we referred to previously as peer leadership and management skills, yielded somewhat stronger effects than training focused on technical knowledge and skill. The outcome criterion measures were classified as cognitive (e.g., technical knowledge and skill) process (e.g., the collective effectiveness of team leadership and management), as determined by performance ratings (e.g., of goal achievement or simulator performance), and affective (e.g., measures of trust, satisfaction). The overall effect sizes for the four outcomes were quite similar. As expected, intact teams yielded slightly higher effect sizes than ad hoc teams, and training was slightly more effective for smaller teams than for larger teams. A review of evaluation research targeted at CRM training is reported by O'Connor et al. (2002). The results from 48 studies were generally positive with regard to end-of-course knowledge and skill measures and observer ratings of cockpit performance. Tannenbaum and Cerasoli (2013) report a meta-analysis of the effects of after-action-reviews for 16 studies involving team training. The subsequent mean gain, compared to control groups was $d=.66$. The results were comparable for simulations and 'for real' performance events. The studies reviewed by Hughes et al. (2016) dealt largely with training medical team personnel in specific skills for the tasks for which they were collectively responsible, including such things as coordinating their activities and monitoring their performance. The after training and transfer effects were substantial ($d's=.60 - 1.00$). Finally, while not from the training literature itself, a meta-analysis by Wang, Waldman, and Zhang (2014) shows that teams which 'share' leadership, as represented by the team leadership and management skills specified in Tables 19.4 and 19.5, perform at a higher level.

Again, the amount we have learned about the most effective ways to train teams is limited, but growing. This is perhaps understandable, given the large array of potentially trainable determinants of team performance; the great variability in team designs, team environments, and team purposes; and the lack of incentives for doing such research, which is expensive. However, given the perceived importance of team performance for organizational performance in the twenty-first-century economy; it would be very useful if this situation changed.

VIRTUAL TEAMS

Given that more and more teams must operate in a virtual environment, it is reasonable to ask whether virtual teams can benefit from training that is focused on specific knowledge, skills, problem solving capabilities, or attitudes/dispositions that

help to facilitate virtual team performance, in addition to the team performance determinants just discussed. Based on a survey of 440 training and development professionals, Rosen, Furst, and Blackburn (2006) argue that there most certainly are. They identify 13 training content areas (p. 238) that would comprise a model training program. However, as reported by the survey respondents, very few organizations formally attempt such training, and, so far, there are no 'evaluation' studies.

One, perhaps unintended, benefit of virtual teams is that they can reduce group process loss resulting from face-to-face interactions, particularly if the composition of the team is multicultural (Gibson et al., 2014). However, Gibson et al. also point out that this benefit is a function of the specific nature of the 'virtual' environment. That is, all virtual teams are not alike. The technology could vary from simple audio conference calls, to asynchronous internet contact, to face-to-face contact a certain percentage of the time, to a full-blown Skype-based group interaction 100 percent of the time. The more 'real' the virtual environment the greater the chances for process loss.

Summary

Research on team training issues has made much progress in the last 15–20 years. We know much more about the relevant parameters of 'teams', the determinants of team performance, and the methods that can be used to train teams on their most critical performance determinants. However, the actual evaluation research on the effectiveness of various training methods for producing changes in specific team performance determinants is still lagging. Given the increasing importance of team performance in the twenty-first-century global economy, it would be best if such research accelerated at a considerably faster rate.

SELF-REGULATION/SELF-MANAGED INSTRUCTION

These two terms have somewhat different meanings. As used in the literature, self-regulation is the more inclusive and refers to the internal cognitions, (e.g., goal choices, effort choices, performance strategies, performance evaluations, etc.), conscious or automatic, that individuals use to manage their own behavior, in all aspects of their life at work. Self-directed learning, or self-managed instruction, refers specifically to

the individual's self-regulation of their own training and learning experiences. Potentially at least, all research and theory on self-regulation is important for understanding self-managed instruction.

Both of these construals can be set in an even broader framework that views human behavior in all domains, even pre-natal, as being under self-regulatory control, virtually at all times, whether we are aware of it or not. That is, self-regulation is a fundamental property of behavior, both human and animal, and it dominates research in psychology, even if it goes by other names. Within this broader framework, a comprehensive and fascinating review of research pertaining to how self-regulatory behavior is transported from generation to generation is given by Bridgett et al. (2015). The overall conclusion is that basic self-regulatory skills have fairly high heritabilities, as well as being a function of multiple learning experiences starting virtually at birth. A relevant implication for the self-management of training is that by the time an individual enters the world of work much of the between-person variability in self-regulatory skills has been determined, for better or for worse. Such training does not start from a blank slate.

Self-Regulation at Work

The literature on self-regulation, as it applies to work behavior, has virtually exploded during the last 15–20 years. For example, see Boekaerts and Corno (2005), Boekaerts, Pintrich, and Zeidner (2005), Lord et al. (2010), Schmidt et al. (2012), Latham (2012), Diefendorff and Chandler (2010), Kanfer et al. (2008), Karoly, Boekaerts, and Maes (2005), and Vancouver and Day (2005). It is a very complex literature written in very abstract discourse with virtually no attempt by the relevant parties to use a more concrete common language. Construct proliferation is quite large. We abstract here only what we think is a basic set of considerations that would need to be considered when attempting to train individuals to better self-regulate, realizing that not everyone would state them in quite the same way. In fact, many people would castigate us for even attempting such a summary, given that self-regulation is such a complex process (e.g., Karoly et al., 2005). Our only reply is that if we want to foster training in self-regulation then we must consider actionable steps. Our summary of the actionable steps is as follows.

Goal selection

A fundamental component of self-regulation is goal choice, or goal planning (Sitzmann &

Johnson, 2012), which implies that an individual's evaluation of his or her current state yields a decision that some kind of goal-directed action is necessary. Much research has shown that goals have a number of important parameters, such as:

- Other things being equal (e.g., goal commitment), specific and difficult (but attainable) goals yield greater attention and effort than easy or general do-your-best goals.
- Other things being equal, the greater the utility of the goal to the individual (i.e., goal importance) the greater the attention and effort devoted to goal attainment.
- Other things being equal, the more temporally distant the goal, the lower the probability of goal attainment.
- Other things being equal, the more complex the determinants of goal achievement the less amenable it is to increases in attention and effort. It requires additional substantive expertise.
- If the individual is attempting to respond to multiple goals during a specified time interval, then other things are not equal, and a number of parameters influence the allocation of attention and effort among goals. (e.g., see Schmidt et al., 2012). Consequently, the attainment of a training goal would be compromised to some degree.
- Much research suggests that unconscious goals also influence self-regulation (Lord et al., 2010). It is possible that unconscious goals (e.g., 'more effort is needed') can be primed in various ways. However, priming is a very complex phenomenon; and is as yet poorly understood (e.g., see Klatzky & Creswell, 2014; Locke, 2015; Schwartz, 2015; Shantz & Latham, 2009).

Strategy development

Given a goal to be pursued, the individual must develop strategies and plans for achieving it. This may indeed be the hard part.

Goal striving

After goal choice, individuals must act to achieve them, given the strategies they have selected. That is, they must direct effort toward goal attainment and persist until the goal is reached. The current term for this domain of motivation is *goal striving*. Its intensity (as a 'static' variable) is a function of the utility of goal achievement (for the individual), the individual's self-efficacy estimate for achieving the goal, and the individual's goal orientation. In general, if an individual's accurate estimate of their self-efficacy

for achieving a specific training goal is low, independent of time constraints, the individual should adopt a different strategy and address prerequisite training goals first. If the individual's accurate estimate of self-efficacy is high then less effort may be sufficient for goal achievement. Inaccurate estimates of self-efficacy can result in suboptimal goal achievement. Also, as discussed previously, individuals should adopt mastery goals and not performance goals for effective self-regulation (Pintrich, 2000), but perhaps not under severe time constraints for accomplishing critical goals (DeShon & Gillespie, 2005). If the individual is attempting to achieve multiple goals the interactions among goal utility, time considerations (i.e., deadlines), and self-efficacy are indeed complex (Beck & Schmidt, 2012, 2015).

Emotion and impulse control

As noted by Kanfer, Ackerman, and Heggestad (1996) excessive anxiety limits performance. Controlling anxiety in a self-regulation context is not easy, and must be addressed by such things as goal revision, changes in goal orientation, and seeking feedback and advice from others. Grant (2013) argues that a straightforward knowledge capability of how to self-regulate emotions has beneficial effects; and Hülshager et al. (2013) advocate for training in 'mindfulness' (i.e., the ability to be non-judgmental about moment to moment experiences) as a way to control emotions.

Self-feedback and monitoring goal progress

Effective self-regulation requires that progress toward learning goals be monitored, and the Kluger and DeNisi (1996) findings regarding feedback hold here as well. Individuals should strive toward cue-oriented self-feedback and refrain from affect laden evaluative self-judgments of overall progress.

Redirection

If a valid monitoring of progress shows that the individual's goals will not be met, then the individual must choose one or more corrective actions (i.e., strategies) from alternatives such as (a) change the goal, (b) increase effort, (c) obtain corrective feedback, (d) develop new skills, or (e) change the context (see Pintrich, 2000).

Self-regulation failure

Self-regulation could fail for any of several reasons, as discussed above. That is:

- Other goals compete with the focal goal and could supplant it.

- The focal goals to be achieved are too distant, and procrastination wins (Steel, 2007).
- Goals are construed as performance goals, not learning goals, and motivation suffers.
- The utility of achieving the focal goal was underestimated.
- The individual's self-efficacy was overestimated, and not enough effort was devoted to goal attainment.
- Goal progress was not monitored and cue-oriented feedback was not generated, or sought.

Self-Regulation Training Goals

The intended implication of the above list of self-regulation components and sources of failure is that they constitute the general training goals for instruction in self-regulation. Consequently, given that self-regulation skills are seen as critical for twenty-first-century employability, we can ask whether the training literature provides methods for teaching such skills and whether there is evidence that such training produces improvement in effective self-regulation.

Can Self-Regulation Skill Be Improved via Training?

This overall question breaks down into two sub questions.

1 Can direct instruction teach self-regulation skills?

There are very few studies here, but controlled evaluation studies by Frayne and Geringer (2000), Frayne and Latham (1987), and Keith and Frese (2005) suggest that it can. The training methods used in Frayne and Latham (1987) and Frayne and Geringer (2000) were things such as: case problems illustrating good, and not so good, self-regulation; group discussion sessions focusing on self-management principles, self-assessments, setting goals, and self-monitoring; and one-on-one coaching sessions with the trainer. As shown in these few studies, such methods do produce increased knowledge for how to self-regulate, along with increases in self-efficacy and more positive outcome expectations for how what they learned in the course would help their performance. Also, a meta-analysis by Sitzmann and Ely (2011) looking primarily at correlational data, showed that individual differences in 'naturally

occurring' elements of self-regulation during training are related to training effectiveness. The analysis was hampered by the lack of a common specification for what is meant by self-regulation. However, in one of the more informative studies, Sitzmann and Ely (2010) used a longitudinal design to show that asking 'reflective' questions to stimulate self-regulation during training itself led to even greater end-of-training achievement. The explanation was that trainees spent a higher proportion of their time on actual learning activity rather than directing their attention elsewhere (e.g., digital devices).

- 2 *Does mastery of self-regulatory skills, either explicitly trained or naturally occurring, produce improved job performance?* This is certainly the expectation of those who advocate explicit training in self-regulation as a twenty-first-century skill. The modicum of evidence produced so far suggests that it does. However, much R&D on how to best train such skills still needs to be done. It is a complex endeavor and must deal with such issues as: (a) the heritability and development of basic self-regulation skills (Bridgett et al., 2015), (b) the superordinate individual goals that are common, or different, across cultures (see Grouzet et al., 2005), and (c) the powerful effects of goals that are often not in conscious awareness and are dealt with automatically. All of this makes self-regulation very complex and difficult to research as a concrete employability skill, yet it is fundamental to effective individual performance in virtually all aspects of work. One example of self-regulation instruction that led to positive outcomes is reported by Noordzij et al. (2013). The training program induced a state learning goal orientation which in turn led to more effective job seeking for people who were unemployed.

Self-Managed Instruction

Self-managed instruction (SMI), or self-directed learning (SDL), is a specific kind of self-regulation. Rather than the entire domain of work behavior, the specific concerns are whether individuals have the skills to plan, execute, evaluate, and perhaps revise their own training experiences. In this sense, self-managed instruction should not be confused with the 'discovery learning' and 'constructivist' models of instruction discussed earlier in this chapter, which refer to the methods of instruction once training goals and a training structure are established. In its broadest connotation, self-managed instruction could refer to any training experience that

is not mandated by an employer, professional organization, degree/certificate granting institution, or regulatory body. A general specification is provided by Ellinger (2004). We wish to give it a somewhat narrower connotation and argue that self-managed instruction is training that is self-designed, in terms of the model of training design universals discussed earlier. That is, effective self-managed instruction consists of being able to execute the following steps:

- 1 Being clear about one's overall training objectives.
- 2 Given the overall objectives, what are the specific training needs, stated in terms of performance determinants that are currently deficient, or will be needed in the future as performance requirements change, perhaps as a function of seeking new responsibilities or new subject matter expertise.
- 3 Translation of the self-assessed training needs to concrete training objectives.
- 4 Selection of training content (i.e., what is to be learned) and training methods (how should it be learned). The individual must understand the benefits of effortful processing and choose training experiences appropriately. This step could be addressed by selecting training courses or training experiences from available options, or by crafting an individualized experience via informal training.
- 5 Practice and feedback experiences should be optimized by the individual, as described earlier in this chapter.
- 6 Individuals must attend to their own direction, level, and persistence of effort. Ideally, everything we know about the effects of multiple goals, mastery versus performance goals, the effects of self-efficacy, and the negative effects of temporal discounting should be available, and accessible, for the individual to consider.

The bottom line here is that if the general training need is to train people to better self-manage their own instruction, the training regimens for doing so should address at least the above six objectives. Fontana et al. (2015) provide a self-assessment instrument for determining how well an individual is currently doing that. The issues are further complicated by the contextual variation in self-managed instruction. For example:

- 7 Many formal training experiences are designed and offered by the employer, an educational

institution, or a private vendor. The individual's task is to simply to choose among them, based on a self-assessment of training needs and whether the appropriate motivational determinants (e.g., self-efficacy, goal orientation, expected outcome utility) exist for the particular course or program. Feedback and practice are specified by the existing courses.

- 8 If none of the available courses or programs address the individual's self-assessed training needs, he or she must execute the full model of training design described earlier in this chapter. That is, training needs must be translated into training objectives such that the individual can seek out the necessary training content to be mastered, and implement appropriate training methods that require effortful processing. Appropriate feedback and practice must be utilized, which means that the individual's self-assessments of progress and goal attainment must be valid. All of this could be done in a very deliberate way via web searches, or in a very informal way utilizing co-workers as sources of training content, or even to serve as trainers.

The literature on self-managed instruction is extensive (London, 1995; Long & Morris, 1995; Manuti et al., 2015; Schmidt, 2000). Probably the most work is related to the concern with adult education and lifelong learning within the educational community (e.g., Candy, 1991). A second prominent source is medical education where the fundamental concern is the need to 'keep current' for the rest of one's career after formal training ends (e.g., Mifflin, Campbell, & Price, 2000). However, given the increasing fluidity of career paths and the dynamic nature of performance requirements, even in a single position, the need for self-managed training is ever increasing across many sectors of the labor force. For example, Ellis, Marcus, and Taylor (2005) document how college students (veterinary science) were not able to use online resources very well. They needed more instruction in self-managed instruction itself, as well as more domain-specific knowledge about online resources.

Research on the effectiveness with which training can improve self-managed instruction is still very sparse. For example, while there is evidence that problem-based learning in medical education will provide higher frequencies of self-managed SMI in medical education itself (Blumberg & Michael, 1992), it is still not known whether such training outcomes will lead to more effective continuing education once the physician

leaves the university environment (Schmidt, 2000). It is also possible for SMI training to have negative effects. Kossek, Roberts, Fisher, and Demarr (1998) assessed the results of an employer sponsored training program in developing career self-management skills by surveying experimental and control groups both before training and 6–8 months after training. The frequencies (as self-reported) of self-management behaviors such as seeking feedback about one's own performance and acting to increase job mobility were lower for the trained groups than the untrained groups. Over the course of the training itself, self-efficacy for career self-management, attitudes toward feedback seeking, and the perceived instrumentality of training all decreased. An increased awareness on the part of the trainee of how much they were *not* now doing and a backlash against the perceived goals of management for sponsoring such training were offered as explanations. In contrast, Gravill and Comeau (2008) showed that the use of self-managed learning strategies had beneficial effects on managers being able to learn to use a new electronic reporting system.

In sum, training to increase self-managed instruction skills is not a simple issue, but such skills will become even more critical in the twenty-first century.

PROBLEM SOLVING, CRITICAL THINKING, AND DECISION MAKING

In the pantheon of discussions concerning 'twenty-first-century Skills' that are critical for the very welfare of nations, organizations, and individuals (e.g., Griffin, McGaw, & Care, 2012; National Research Council, 2012; OECD, 2013), effective problem solving is always near, or at the top of the list, followed closely by critical thinking and creativity/innovation.

Problem Solving

The study of problem solving has a long history in psychology. A brief synopsis is provided by Ohlsson (2012) and Fischer, Greiff, and Funke (2012). Problem solving research has waxed and waned over the last century, but currently seems to be in a boom period (Funke, 2013). In 2012 articles on problem solving appeared in 171 different journals, up from 56 in 2010. Much of the increase seems to be due to the perceived importance of problem solving for the

twenty-first-century economy and the attempts to include assessments of complex problem solving skill (CPS) in the Programme for International Student Assessment (PISA) sponsored by the Organization for Economic Cooperation and Development (OECD, 2010). The current assessment technique, for PISA purposes, involves using computer simulations of hypothetical complex problems that require the test taker to: (a) discover the causal relations among different sets of hypothetical entities (perhaps just squares and circles), via trial and error or some other strategy of their choice (perhaps guided by the simulation instructions); and (b) use the discovered relationships to achieve certain outcomes (i.e., goals) specified by the simulation (e.g., increasing the 'value' of certain outcomes). Three such simulations (MicroDYN, the GeneticsLab, and MicroFIN) are described by Greiff, Fischer et al. (2013).

Assessed in this way, CPS is seen as distinct from general cognitive ability, as measured by paper and pencil, or computer adaptive tests, because the simulations ask the assessee to search for and identify causal relations that are initially hidden, and then use what they discover to develop strategies for achieving certain goals, which is 'different' than responding to test items. The simulations are designed to minimize the influence of domain-specific knowledge. The measurement goal is to assess 'domain-general' problem solving skills. Incorporation of such skill assessments into work and organizational psychology is strongly advocated by Neubert et al. (2015). We should note that this specification of problem solving does not conform to ours as defined in Table 19.2. That is, the simulated problems do have pre-specified correct solutions.

The foundational questions at this point are: (a) are the resulting simulation scores reliable; (b) do they have meaningful construct validity, as something distinct from general cognitive ability; and (c) do they provide incremental validity for predicting outcomes? Currently, research on these issues is reported by Greiff, Fischer et al. (2013), Greiff, Wüstenberg et al. (2013), Schweizer, Wüstenberg, and Greiff (2013), Sonnleitner et al. (2012, 2013), and Wüstenberg, Greiff, and Funke (2012). In general, the latest versions of the simulations have much improved reliability; however, in general, the intercorrelations of the CPS scores from the various simulations and their cross-correlations with measures of cognitive ability are about the same (i.e., .45 – .55). Based on such intercorrelation data, CPS seems not that distinguishable from GMA. The results for the incremental validity of CPS scores over measures of general cognitive ability are mixed. The strongest results (R increased from

.34 to .43) are reported by Wüstenberg et al. (2012). The other studies showed small, or near zero, incremental validities (Sonnleitner et al., 2013). However, both the development of the simulations and validation research are still in the early stages. Previous to the development of the CPS assessments, the research record showed very little construct or incremental validity for trait measures of problem solving or critical thinking (Kuncel, 2011).

A more relevant question for the current chapter is whether problem solving or critical thinking skills can be specified as 'state' variables that are responsive to instruction. That is, can they be trained at some stage of an individual's work or educational history? The developers of the CPS measures have not yet addressed this issue. If such skills can be trained, how should it be done? Addressing these two questions requires some specification for what these capabilities are, when viewed as skills that can be developed. Given the thousands of articles and hundreds of volumes that have problem solving, critical thinking, or creativity in the title, detailed and agreed upon specifications for each remain elusive. In Table 19.1, we characterized problem solving as an individual's capability for developing solutions to ill-structured problems, which are problems for which the solution procedures are not known for sure, and the best solution is still a matter of 'expert' judgment. The implication (in Table 19.1) is that training could help develop such a capability.

A major consideration is whether such capabilities are specified as 'general' or 'domain specific'. That is, for example, is there a general problem solving capability that can be learned, and which is then applicable (i.e., transferable) to any problem solving content domain (e.g., auto engine troubleshooting, development of tax law), or must individuals become better problem solvers within specific domains, and the capability will probably not transfer across domains? Potentially, this leads to two kinds of training experiences, learning effective general rules and procedures, versus developing domain-specific expertise.

Training aimed at teaching general rules and procedures for effective problem solving does exist, from middle school to higher levels of organization management, and most are based on learning an idealized procedure that goes something like as follows. A somewhat similar, but much more abstractly described, procedure is given by Fischer et al. (2012).

- Identify the problem accurately, perhaps via consultation with other knowledgeable parties. Do not immediately assume that you know the 'right' characterization. Spend *more* time than

you think is really needed on problem identification/specification.

- Develop a consensus about how the problem should be characterized.
- Determine the extent to which the problem is interrelated with other problems, if at all.
- Generate possible solutions. Consult with as many people as possible. Do not immediately assume that you 'know' the best solution.
- Evaluate the alternatives. Seek consensus on the evaluations. Determine whether the evaluation process changed the original characterization of the problem.
- Choose what seems to be the best alternative solution.
- Determine whether the chosen solution will have implications for other parts of the organizational system in which it would be implemented. Modify the solution if the system implications seem to require it.
- Realize that this procedure will not occur in an orderly fashion, but keep coming back to the basic steps to make sure that they have been considered.

There have been general problem solving courses offered at the university level (e.g., Hayes, 1980; Rubenstein, 1980), for elementary and junior-high-school students (Covington, Crutchfield, Davies, & Olton, 1974; Hernstein, Nickerson, de Sanchez, & Swets, 1986), and for managers (e.g., Kepner & Tregoe, 1965). In addition to following the above steps, such courses attempt to teach certain strategies (e.g., means-end analysis, reasoning by analogy), heuristics (e.g., always verbalize the problem explicitly), or rules of thumb (e.g., spend more time in problem identification than you think necessary, describe it to as many other people as possible). Relative to such course content, we will still assert that evaluative research with adult populations is virtually non-existent, but what research there is suggests that such courses have positive, but very small, effects on end-of-course criterion measures. For example, Batha and Carroll (2007) presented university students with a one-page information presentation 'course' on what they called 'meta-cognitive' procedures, which were very similar to the rules listed above. The 10-minute course improved performance on case problems requiring a rank ordering of potential solutions. There is no research on transfer effects. At this point, we still do not know whether there are domain-free determinants of effective problem solving that can be trained, such that they transfer to the work setting.

Critical Thinking

Critical thinking (CT) is also much touted as a crucial twenty-first-century skill (Griffin et al., 2012). Where does CT fit into the problem solving schema? Is it just a different label for the same thing, or is it something distinct? There are actually two construals for critical thinking, which we could label *cognitive* CT and *dispositional* CT (Halpern, 1998). Specifications for cognitive CT, such as they exist, are similar to the specifications for problem solving itself, with perhaps more emphasis on evaluative questions such as being able to determine:

- What information is actually relevant?
- What additional information is needed?
- What information is the most/least important?
- What information is needed to infer cause?
- What are the explicit/implicit assumptions contained in an assertion?
- What are legitimate, and not legitimate, reasons for drawing a conclusion?

Cognitive CT also incorporates the necessity for constantly reconsidering the definitions of the problem itself in light of the results of the solution generation and evaluation process. Dispositional CT refers to the strength of an individual's characteristic tendencies, or motivation, to ask the CT-type evaluative questions listed above, and to always question the proposed benefits for a particular solution choice.

Being able to apply these strategies is the hoped for result when problem solving and critical thinking are identified as important twenty-first-century skills. In general, there is no evidence that learning these general strategies improves problem solving *or* critical thinking in work roles. What does improve such performance is the acquisition of domain-specific expertise, which includes knowledge and skill, and experience in using them appropriately (Kuncel, 2011). Tricot and Sweller (2014) argue that teaching domain-general strategies does not work in education either. Even weak evidence to the contrary can be explained in terms of the domain-specific skill components that are still there. Consequently training should focus on domains of expertise, even at elementary levels, such as basic statistical reasoning and financial analysis, that are widely applicable. After expertise is established it would do no harm to also teach the general rules of problem solving and critical thinking. All such training should include practice in solving domain-specific problems across a variety of settings. One example, close to home, is training in the design of research. Development of

an appropriate research design is an ill-structured problem. To be effective, graduate students must know a lot and they must practice creating study designs for a variety of purposes.

One implication of the above is that education and training for employment could benefit if we had a much more comprehensive needs analysis of the specific, yet broad, domains of expertise that are important for many jobs or occupations. One example of such a needs analysis, for the tourism and hospitality industry, is reported by Middleton (2002).

Decision Making

Decision making skill is strangely absent from the discussion of twenty-first-century skills, and yet the literature on decision making is quite large. Also, relative to its status as a determinant of leadership, management, and team performance, decision making has undergone something of a rebirth in the form of naturalistic decision making (NDM) (e.g., see Klein, 2008).

At considerable risk of great oversimplification there seem to be five principal strands of decision making research: (1) formal models of how decisions *should* be made, such as formulated in economics or game theory; (2) models of behavioral decision making (Edwards, 1954), that attempt to model how individuals actually make decisions in specified situations, (e.g., the subjective expected utility model – SEU); (3) the model of bounded rationality (Newell and Simon, 1972) that seeks to identify the heuristics that make decision making possible in a complex world. For example, we satisfice not maximize; (4) the long line of research by Tversky and Kahneman ((Kahneman, Slovic, & Tversky, 1982) that focuses on a variety of decision making heuristics and biases (HB) that most of us seem to have, and which produce suboptimal decisions; and 5) naturalistic decision making (NDM) which is an account of how expert, or not so expert, individuals actually make decisions in the real work world. For NDM, decision making is virtually synonymous with problem solving, as characterized in Table 19.1. Consequently, we could also ask, in the real world, how do experts actually solve problems? In a very useful, succinct, and clear way (something of a rarity in the current literature), Kahneman and Klein (2009) examine the similarities and differences between the NDM and HB views of decision making, and find them quite compatible. Again at the risk of oversimplification, the basic message(s) seem to be the following. Yes, individuals do exhibit dysfunctional heuristics and biases even when we

think they should have the expertise to prevent them. Yes, sometimes individuals do make decisions very quickly. Some call it being intuitive: Sometimes they are right and sometimes they are wrong. There are such things as ‘true’ experts and ‘pseudo’ experts. The intuitive decisions of true experts are effective much more often than the intuitive decisions made by pseudo experts.

NDM describes expert decision making (aka problem solving) as not an evaluation of alternatives, but as a rapid identification of a primary alternative via a cued search of LTM, and then an evaluation of that alternative via forecasting what would happen if it were implemented, and revising the chosen alternative accordingly. For this process, which includes both intuition and rational deliberation, to be successful, two major things must be true. First, the domain of interest must consist of stable elements of knowledge that are consistent across time, and thus can actually be learned. Second, the individual decision maker must have mastered these stable elements to a high level of proficiency. If these two things are not true, then people who profess to be experts are pseudo experts, and they can be quite wrong, *either* when thinking fast or thinking slow. Domains such as the future performance of specific stocks or the future performance of specific job applicants are examples of domains that are not well enough understood to permit very accurate prediction by ‘experts’. Consequently there can be no true experts. Simple algorithms, based on whatever valid relationships research can discover, will always beat human judges who believe (wrongly) they have a rich domain expertise.

Training Implications

What then are some of the occupational training implications of the decision making literature? They are things such as the following:

- For people in decision making roles, not necessarily ‘leaders’ or ‘managers’, does their domain expertise match the domain(s) within which they must generate decisions/solutions? If not, they need more domain-specific training/education.
- Can individuals, or teams, learn to recognize when they do not have sufficient expertise for a particular decision making situation?
- Given an appropriate level of domain-relevant expertise, have individuals had sufficient practice in identifying and evaluating decision solutions?
- Given appropriate individual expertise, can teams learn the teamwork skills (discussed previously)

that are necessary to make effective team decisions? Have they had sufficient practice in doing so?

- Do individuals know which heuristics and biases lead to flawed decision making? Can they self-evaluate and identify the ones they are succumbing to during real-world decision making?
- Do teams know which heuristics and biases (e.g., group think) degrade team decision making? Can they identify and circumvent them?

These are difficult objectives to translate into training experiences. Specifying the training content, training methods, and practice and feedback conditions for such capabilities would not be easy. Perhaps one major reason that more progress has not been made is that the OPOB (organizational psychology and organizational behavior; aka Work and Organizational Psychology) and the judgment and decision making (JDM) literatures do not interact enough (Dalal et al., 2010). Major steps toward addressing this situation are described in a volume edited by Highhouse, Dalal, and Salas (2014), which was compiled specifically for that purpose. For example, Van Knippenberg (2014) suggests how the decision making literature can better inform research on leadership and management.

Directly to the point, Grossman et al. (2014) discuss specific training methods, given high individual technical expertise, that can address development of expertise pertaining to the teamwork knowledges and skills that we discussed previously. Technical skill and teamwork skill are two different domains, and expertise in one does not imply expertise in the other. Both are necessary for effective team decision making *and* problem solving. As always, training in both requires effortful processing, appropriate practice and feedback, and motivated team members. Grossman et al. (2014) cover all these issues. In another chapter, Sonesh, Rico, and Salas (2014) point out how certain illusory beliefs (i.e., heuristics and biases) can develop in teams and degrade team decision making.

In sum, the training literature and the JDM literature are beginning to be integrated. There should be considerable future payoff, if the resulting synthesis can better inform what to teach to improve both individual and group decision making and problem solving.

Overall Summary

For all the attention devoted to problem solving, critical thinking, and decision making, the implications for training are very sparse. The principal

conclusion is that the transferable effects of teaching domain-general skills are weak to non-existent. We simply must decide what the critical domain-specific, but broadly applicable, areas are, and give people extensive practice in generating solutions to ill-structured problems within each domain.

LEADERSHIP AND MANAGEMENT TRAINING AND DEVELOPMENT

Leadership theory and research produced a vast literature during the twentieth century (e.g., Bass, 1990; Yukl, 2013; Yukl & Van Fleet, 1992). Output has continued, virtually unabated during the first 15–20 years of the twenty-first century (Bass & Bass, 2008; Bryman et al., 2011; Day, 2014; Day & Dragoni, 2015; Hannum, Martineau, & Reinelt, 2007; Rumsey, 2013). We will certainly not attempt to review it here! It is also true that the increasing globalization of national economies during the twenty-first century is forecasted to present, and does present, some additional performance requirements for leadership and management in organizations, wherever in the organization it resides (e.g., Bassi, Cheney, & Lewis, 1998; House, Wright, & Aditya, 1997; Mobley, Gessner, & Arnold, 1999; Smith, 1997). These additional requirements range from dealing with much more rapid changes in technology, competitive pressures, dynamic customer preferences, and the parameters of the labor market, to managing the increasing diversity of cultures within the organization, including the management ranks, as well as carrying out leadership and management functions in developing economies and different national cultures. People from different cultures do bring different value systems to work (England & Harpaz, 1990; Farris & Parry, 2011; Haire, Ghiselli, & Porter, 1966; House et al., 2004; Littrell, 2002; Littrell & Barba, 2013; Littrell et al., 2013; MOW, 1987).

Broadly construed, the major goals of management and leadership functions in both private and public (not political) organizations tend to be transnational and universal. That is, the major goals, or desired outcomes, are (a) the facilitation of effective unit or organizational goal setting and providing support for goal accomplishment, (b) promoting high levels of individual motivation, commitment, and satisfaction, (c) increasing the probability that individuals within the organization will set very high goals for themselves, not be reluctant to take on new challenges, and will place the effectiveness of the organization above

their own self-interests, (d) facilitating effective interactions among individuals within teams or units, and (e) achieving a high level of appropriate coordination among units. We mean this to be a brief amalgamation of the recurring findings in leadership and management research over the last 60–70 years (Bass & Bass, 2008; Hughes, Ginnett, & Curphy, 2014; Yukl, 2013).

Specifications for Leadership and Management

For purposes of designing and then evaluating training and development efforts, we think it is useful to distinguish between leadership functions and management functions. The current literature tends to lump them together, sometimes under the leadership label and sometimes under the management label. The current literature also tends to be unclear about the distinctions among: (a) leadership or management *performance itself*; (b) the *determinants* of performance itself (e.g., Zaccaro, 2012); (c) the proximal and distal *outcomes* of performance itself; (d) the situational factors that influence (i.e., moderate) the relationships between the determinants of leadership and management performance, and performance itself (e.g., Nielsen & Cleal, 2011); and (e) the situational factors that influence the relationships between performance itself and its proximal outcomes (e.g., individual or team performance, individual satisfaction). A full discussion of leadership and management outcomes measures is presented in Hiller et al. (2011). The causal framework we are using here (see Campbell, 2012) is as represented in Figure 19.1. That is, individual differences in leader performance are a direct function of real-time differences in the individual's knowledge, skills, and directed effort. These direct determinants mediate the causal effects of a complex set of 'trait' and 'state' indirect determinants, including the interactions with a wide range of context variables. In turn, individual differences in leader/manager performance itself result in a number of proximal outcomes that can be influenced by a wide variety of contextual factors as well. Our chief concern in this sequence is with the trainable determinants, direct or indirect, of performance itself.

Although others would emotionally, viscerally, and sometimes rationally, disagree (e.g., Alvesson & Spicer, 2014; Brodbeck & Eisenbeiss, 2014; Ibarra et al., 2014), we think it is useful to distinguish leadership and management in the following way. Leadership performance refers to the interpersonal influence of one or more people by another for the purpose of accomplishing the

group or organization's goals. The context of the influence could be face-to-face interaction, or communication via telephone, email, texts, Skype, etc. to a specific person. 'Charismatic' speech-making to large groups is not leadership, it is something else, although no less important, perhaps. Management performance refers to the setting of goals (aka 'vision'), and the management of resources to achieve those goals. It also includes coordinating the efforts of multiple groups and managing relations with external publics (e.g., regulatory agencies). We also realize that leadership and management are reciprocal processes that invite reactions from the 'led' and from the 'managed', and are dynamic, not static. However, taking a nihilistic position that leadership and management defy specification is counterproductive. All meaningful research then stops: Only anti-theory is left.

The basic components of leadership and management performance *itself* (i.e., the observable things leaders and managers actually *do*) are given by over 70 years of research (primarily US-led), using multiple methods (e.g., self-ratings, observer ratings, critical incidents from various observers using various prompts, and systematic observation of behavior in simulations or group-problem solving exercises). There are slightly different summaries of this research by various people (e.g., Fleishman et al., 1991; Hamlin, 2004; Yukl, 2012), but we of course like the one by Campbell (2012) who concluded that the previous literature is best represented, at a particular level of specificity/generality, by six basic factors of leadership performance and eight basic factors of management performance. The factors are shown in Tables 19.5 and 19.6.

Individual 'leaders' or 'managers' can score high or low, or somewhere in between, on each of them. It might be argued, as do Hackman and Wageman (2007), that extreme dysfunctional performance on some of the dimensions is not just very low performance on those dimensions, but something different and distinct. Measurement efforts by Shaw, Erickson, and Harvey (2011) seem congruent with representing dysfunctional leaders/managers as very low scorers on the factor in Tables 19.5 and 19.6. In contrast, a number of the measures of destructive leadership included in a meta-analysis by Schyns and Schilling (2013) seem more like indicators of counterproductive work behaviors, with which they actually have the highest correlations, than low scorers on the leadership and management factors. These are measurement and scaling issues that are as yet unresolved (e.g., see Spector & Che, 2014). The fundamental issue here is how best to represent the content of leadership and management performance functions, in terms of what the individual actually does, be it good or bad. The descriptions of the factors in Tables

Table 19.5 Six factors comprising leadership performance (from Campbell, 2012)

1. *Consideration, Support, Person-Centered*: Providing recognition and encouragement, being supportive when people are under stress, giving constructive feedback, helping others with difficult tasks, building networks with and among others.
2. *Initiating Structure, Guiding, Directing*: Providing task assignments, explaining work methods, clarifying work roles, providing tools, critical knowledge, and technical support.
3. *Goal Emphasis*: Encouraging enthusiasm and commitment for the group/organization goals, emphasizing the important missions to be accomplished.
4. *Empowerment, Facilitation*: Delegating authority and responsibilities to others, encouraging participation, allowing discretion in decision making.
5. *Training, Coaching*: One-on-one coaching and instruction regarding how to accomplish job tasks, how to interact with other people, and how to deal with obstacles and constraints.
6. *Serving as a Model*: Models appropriate behavior regarding interacting with others, acting unselfishly, working under adverse conditions, reacting to crisis or stress, working to achieve goals, showing confidence and enthusiasm, and exhibiting principled and ethical behavior.

Table 19.6 Eight factors comprising management performance (from Campbell, 2012)

1. *Decision Making, Problem Solving, and Strategic Innovation*: Making sound and timely decisions about major goals and strategies. Forecasting future trends and formulating strategic and innovative goals (aka 'vision') to take advantage of them.
2. *Goal Setting, Planning, Organizing, and Budgeting*: Formulating operative goals; determining how to use personnel and resources to accomplish goals; anticipating potential problems; estimating costs.
3. *Coordination*: Actively coordinating the work of two or more units, or the work of several work groups within a unit. Includes negotiating and cooperating with other units.
4. *Monitoring Unit Effectiveness*: Evaluating progress and effectiveness of units against goals: monitoring costs and resource consumption.
5. *External Representation*: Representing the organization to those not in the organization (e.g., customers, clients, government agencies, nongovernment organizations, the 'public').
6. *Staffing*: Procuring and providing for the development of human resources. Not one-on-one coaching, training, or guidance.
7. *Administration*: Performing day-to-day administrative tasks, documenting actions and making information available in a timely manner.
8. *Commitment and Compliance*: Compliance with, and commitment to the policies, procedures, and directives of the organization together with loyal constructive criticism.

19.5 and 19.6 are intended to be straightforward and relatively mundane. Words such as 'charismatic', 'transformational', and 'spiritual' are not used, although their substance is meant to be represented (see Campbell, 2013). Based on the same literature, other representations could be more, or less, differentiated, and use more, or fewer, factors. This is not an assertion that the usual sort of rating scales (e.g., from 360 data) will necessarily reproduce these factors if their intercorrelation matrices are factor analyzed (see, Campbell, 2015). However, we do assert, as do Bass (1997), Dai and DeMeuse (2013), Hamlin (2004), and Hamlin and Patel (2012), that the *general* content of the factors themselves seems to be largely invariant across organizational levels, organizations, and even cultures, although their relative importance may differ. There may also be cultural differences in what score level is optimal for producing effective outcomes, and exactly what behaviors constitute each factor in a particular culture (Brodbeck, Frese, & Javidan, 2002; Littrell, 2002, 2013; Littrell et al.,

2013; Wang, Tsui, & Yin, 2011). An excellent review of the cross-cultural literature pertaining to these issues, with which we mean to be consistent, is given by Brodbeck and Eisenbeiss (2014).

There can be, and are, different sources of leadership and management performance contributions. As per the conventional wisdom, there is hierarchical (e.g., supervisory/manager/executive) leadership and management, but there can also be peer leadership and management, and perhaps even subordinate leadership and management. These sources can operate at any level in any organization (Clarke, 2012). All of this broadens considerably the loci of leadership/management training and development. If 'leadership' is identified as a critical twenty-first-century performance capability, does it refer to high level (i.e., executive) management, middle management, first level supervision, or peer leadership and management in teams (e.g., production teams, project teams, management teams)? The existing literature is not perfectly clear, but the most reasonable answer is 'all

of the above'. That is, the twenty-first century needs effective peer leadership and management as much as it needs effective executive leadership and management, throughout the organization. Again, leadership and management performance contributions do not reside only within specific people designated as 'leaders' or 'managers', and there are certainly reciprocal and reactive processes. Also, as pointed out by Carter et al. (2015), leadership and management performance do not occur in a vacuum, and the friendship or work-oriented networks within which individuals function will influence the effectiveness of their performance. In sum, for an individual's leadership or management performance behaviors to be effective (i.e., lead to valued outcomes) they must be able to accommodate a variety of contextual variations (e.g., being too participative may be seen as 'weakness' in some cultures). Leadership and management training and development must 'teach' people how to accommodate important contextual variations, perhaps even paradoxical ones (Zhang et al., 2015).

Training Needs, Training Content, Training Methods

Within this framework, what are the primary training needs (i.e., the critical trainable determinants of leadership and management performance), and what are the most useful methods by which the critical knowledge, skills, problem solving capabilities, and attitudes can be learned. The literature specific to leadership and management training tends to emphasize training methods over training content and there is considerable discussion of case analysis, simulation, gaming, coaching, 360 feedback, mentoring, apprenticeships, and job rotation or job assignment programs of various kinds (e.g., see Backus et al., 2010; Day, 2011). Coaching, mentoring, apprenticeships, and other forms of guided experience seem to receive the most emphasis, rather than formal instruction (DeRue & Myers, 2014; Feldman & Lankau, 2005; Haggard et al., 2011; Weinberg & Lankau, 2010). Self-managed informal learning is also emphasized. Day et al. (2014) take a very broad view of leadership (and management?) development and portray it as occurring over the life span, as the result of both guided, and unguided experiences in the context of an array of individual differences that are predictive of leadership performance. However, McCall (2004, 2010) is quite clear in stating that while most of leadership training and development must be a function of experience, there are useful experiences and not so useful (maybe even counter-productive) experiences. Experience must be relevant (i.e., deal with the important determinants of leadership/management performance), challenging,

and guided. Optimal feedback is necessary (see also Day, 2010; DeRue & Wellman, 2009; DeRue et al., 2012). There is also a role for specific training programs; but regardless of whether the time frame is long or short and the content is experience-based or training venue-based, the 'universals' in training design discussed earlier in this chapter will exert their influence, by design or by default.

Discussion of the content of leadership and management training and development seems to be short changed, although Day et al. (2014) present a general taxonomy of such content. For methods such as coaching, job rotation, challenging job assignments, and guided experience (e.g., mentoring, apprenticeships) the content is dictated by the individual's manager, mentor, advisor, or coach, and by the nature of the specific assignment, or by the individual's self-management. Such content frequently entails specific technical knowledge pertaining to managing a specific system, to the leadership and management capabilities included in 360 feedback systems, or to challenging twenty-first-century global experiences. Dragoni et al. (2011) and Dragoni et al. (2014) have shown that such experiences do lead to improved strategic thinking competencies, as measured by assessment centers.

If we step out of the specific management and leadership training literature, then specifications for training content are provided by the interpersonal skills, goal setting, self-regulation, decision making, and team training literatures discussed previously. They all seem to deal with important determinants of management/leadership performance. Bakker-Pieper and deVries (2013), Carton, Murphy, and Clark (2014), and DeRue and Myers (2014) suggest additional leadership performance determinants that could be candidates for training and development. Mumford, Campion, and Morgeson (2007) also suggest that performance on the leadership and management factors may require different skills across organizational levels. In our view, the overall content development strategy must be to identify the knowledges, skills, problem solving strategies, and attitudes that are necessary for effective performance on the six leadership factors and eight management factors discussed above, and some could be context or culture specific. For example, the *Journal of Management Development* has recently published numerous discussions of ideological, philosophical, and spiritual values, which can differ across cultures, as determinates of leadership/management performance (e.g., Hassi, 2012; McDonald, 2011; Muyzenberg, 2014; Swierczek & Jousse, 2014). A special issue of *The Leadership Quarterly* (Arvey et al., 2015) also discusses these issues.

The Virtual World

As many have observed, much of the interaction among individuals at work in the future will be 'virtual', in whatever forms future technology presents. Consequently, it is legitimate to consider what different kinds of knowledges, skills, domain-specific problem solving strategies, and attitudes/dispositions it will take to be a high performer, in the virtual world, on the leadership and management performance capabilities shown in Tables 19.5 and 19.6; and will the relative importance of the performance components change. For example, will showing consideration and support (factor 1) or communicating goal emphasis (factor 3) require different skills in the virtual world than in face-to-face interaction (e.g., written communication skill)?

Only a very few studies have addressed these issues (e.g., Gajendran & Joshi, 2012; Hambley, O'Neill, & Kline, 2007; Hoch & Kozlowski, 2012; Purvanova & Bono, 2009). A brief review is given by Schmidt (2014). We will need much more research and it will be a struggle for it to keep up with technological innovation.

Evaluation of Leadership/Management Training and Development

The leadership/management training and development evaluation literature has produced several meta-analyses over a 30-year period (see Avolio et al., 2009; Burke & Day, 1986; Collins & Holton, 2004; Powell & Yalcin, 2010). The results of these meta-analyses are generally positive, but the magnitudes of the effect sizes, while sometimes substantial (i.e., .20 – .80), are not as large as for specific skills training, as noted earlier in this chapter. However, the management/leadership evaluation literature varies considerably in the nature of the training objectives (if they are even stated), the kinds of training content and methods that are used, and the criteria used to evaluate the training effects. There is no common framework. However, the fact that results were still positive is encouraging. Two recent studies (Brown & May, 2012; Packard & Jones, 2015) are consistent with the meta-analyses and show positive effects, and evidence of transfer. In a very interesting study, Yeow and Martin (2013) evaluated the effects of training in self-regulation on leadership and management performance in a 24-week simulation of a business operation embedded in a university course in management strategy. Compared to a control group, the teams whose leaders took the self-regulation intervention showed higher performance and the leaders received higher ratings of effectiveness from other team members.

Also, at least two other recent studies (Gaddis & Foster, 2015; Stiehl et al., 2015) show significant ATIs between personality/dispositional characteristics and training method. Further, Dragoni et al. (2009) showed an interaction between goal orientation and the level of 'challenge' in developmental job assignments. That is, individuals high on learning orientation benefited much more from 'growth' assignments. We need much more such research. We also need much more research comparing the effects of alternative training methods for the same training objectives. If such research results were then codified in a common framework, it would be of immense value to the leadership/management training enterprise. One general conclusion from the current literature is that while leadership/management experience over a long period of time may be the dominant training and developmental strategy, more short-term explicitly designed training can have positive effects.

Future Training Needs

In terms of twenty-first-century training needs regarding leadership and management, more systematic attempts to address trainable determinants of the six leadership and eight management performance factors would be beneficial for all economies. However, four domains are of particular interest. First, if much of twenty-first-century work will be in teams, then more training in peer leadership and management, even perhaps at the secondary-school level, would be valuable. Second, some initial research (e.g., G. Wang et al., 2009; J. Wang, 2011) suggests that in developing countries leadership/management training for supervisors and middle managers that follows the so-called 'Western' model would be useful, perhaps because globalization is forcing more similarity in organizational structures and processes. Again, even though the precise nature of how they are executed may vary by culture, which research must establish, the basic dimensions of leadership and management performance seem to be invariant. Third, Tepper (2007) has established that 'abusive' leadership is a serious problem, and it has generated a substantial literature. However, to date, no one has tested a training and development remedy. It should be higher on the agenda. Fourth, at any organizational level, individuals would enter a leadership/management training experience with their own implicit theories of what leadership and/or management are (Day & Dragoni, 2015; DeRue & Myers, 2014; Dinh & Lord, 2012; Lord & Dinh, 2014). Such implicit theories (after all, each of us already knows what

leadership is – don't we?) represent the pre-training levels of leadership/management knowledge, skills, problem solving strategies and attitudes. How will they interact with the training and development experience? We need to know.

TRAINING FOR IMMIGRANTS AND EXPATRIATES

Crossing national borders for employment purposes has been going on for centuries and is not unique to the industrial revolution, the information technology revolution, or globalization. Military conflict, religious conflict, population demographics, and changes in food supplies, as well as economic forces, have all had major influences. We will certainly not try to deal with such issues here. Our concern is with what the training literature has to say, over the last 20–25 years, about facilitating the performance and well-being of individuals who travel to other countries for occupational purposes. The target groups are widely varied. They range from technical or management specialists from multinational organizations, referred to as expatriates, who are in the host country for a limited time and limited purposes, and then return (i.e., repatriate); to employees of such organizations who take on long-term job assignments in the host country; to technical, professional, production, or even entry-level people from one country who individually immigrate to take positions with organizations in another country on a long-term, but not permanent, basis; to individuals who immigrate for employment purposes with the full intention of remaining permanently in the new country. Consequently, the training enterprise could be concerned about many kinds of individuals, varying from a high level corporate executive heading an international subsidiary for a year, to unskilled individuals from one country taking advantage of labor shortages or job opportunities in another. Currently, both cross-border job assignments by multinational organizations and individual immigration take place in many different parts of the world and the patterns of expatriate and immigrant flows have been changing significantly over the last 10–15 years.

Expatriates and Training

Not surprisingly perhaps, management and technical personnel of international organizations working on temporary assignment in the host country

have received the most training research attention. It has been sufficient to generate at least six literature reviews (Black & Mendenhall, 1990; Deshpande & Viswesvaran, 1992; Kealey & Protheroe, 1996; Littrell et al., 2006; Morris & Robie, 2001; Ronen, 1989). One consistent finding is that training programs for expatriate managers and technical people have been limited in scope, if they are available at all, and most multinationals do not offer such training. Also, such programs are not generally based on systematic needs analyses (Littrell & Salas, 2005). Most training programs for this kind of expatriate are based on prior research and theory pertaining to cross-cultural training (Bhawuk & Brislin, 2000; Kealey & Protheroe, 1996; Moon, Choi, & Jung, 2012; Nam, Cho, & Lee, 2013) and view the training goal as successful adjustment to the host country culture.

Within the cross-culture framework, the above authors identify the major determinants of successful adjustment as:

- An accurate assessment of spouse and children's needs.
- Being able to replace the sources of pleasure and happiness in the home culture with acceptable substitutes available in the host country.
- Knowing how to acquire information about the host culture, including the organizational culture.
- Knowledge of specific business practices in the host nation and industry sector.
- Developing specific strategies for coping with the stress produced by the new situation.
- Developing high self-efficacy regarding one's technical competence as exhibited in the host country position.
- Developing genuine friendships with host nationals.
- Being willing and able to communicate widely with host nationals, not just a very few people within the immediate work group.
- Having an accurate understanding of the rules, customs, behavioral dispositions, and causal attributions that are characteristic of host nationals, and being able to interpret behavior in the same way host nationals do.
- Having a capacity to be tolerant of culture differences with which the expatriate may fundamentally disagree.

Ren et al. (2014) derive (conceptually) many of the same training objectives from the literature on 'proactive tactics' that people can use to acquire resources, achieve their goals, minimize stress, and promote personal development. In the expatriate

context such tactics are grouped under: (1) information seeking; (2) relationship building; and (3) positive framing of the expatriate position as providing gains, not losses. The assumption in the literature seems to be that all of the above capabilities are trainable to some degree. The training programs designed to deal with such determinants tend to focus on the following domains of content: (1) Information about the host country's economy, demographics, geography, and governmental structures and policies; (2) general information about the host country's culture and dominant values; (3) language skills; (4) general knowledge of management and leadership practices in the host country, and (5) interpersonal skills relevant for cross-cultural interactions. Content that is seldom covered is knowledge of the specific culture of the host organization, or how the leadership and management capabilities discussed earlier can be best executed.

The instructional methods used to teach such content are many and varied; and include such techniques as: (a) straightforward information techniques, including classroom lectures, written manuals, and online materials; (b) information presentations with varying degrees of trainee response such as group discussion or online bulletin boards or chat rooms; (c) using expatriates who have returned from the same, or similar, assignments in the host country to recount their experiences and, perhaps, lead a discussion of the points raised by the description of those experiences (e.g., see Nery-Kjerfve & McLean, 2012); (d) use of the 'cultural assimilator', which is essentially a situational judgment test that poses a hypothetical situation (hopefully based on valid information) and asks the trainee to choose one of several alternative courses of action, which is then discussed in terms of its usefulness in the host culture; or (e) various forms of simulations or modeling exercises on which the trainee can receive feedback. No research exists that compares alternative methods for achieving particular training objectives. Our previous discussion about requiring effortful processing and optimized practice and feedback to maximize transfer holds here as well. A related issue in the literature concerns whether it is best for expatriate training to occur before assignment or after assignment when the expatriate has had some initial experience in the host country, but there are no definitive answers.

The Evaluation Literature

The actual expatriate training evaluation literature is sparse. The most recent summaries are given by Morris and Robie (2001), Littrell and Salas (2005),

and Littrell et al. (2006). There are between 15 and 25 studies cited depending on different exclusion rules. The dependent variables vary from end-of-training measures such as knowledge tests, situational judgment tests (e.g., the cultural assimilator), and role-playing exercises, to subsequent on-the-job measures of performance, job satisfaction, self-rated adjustment, or leaving early and returning home (i.e., attrition). It has been estimated that the average cost of expatriate attrition is US\$ 200K–250K per person (Zhang, 2012). The overall effect sizes have been positive, but relatively small, and exhibit variability that cannot be totally explained by artifacts. Summarizing the evaluation results is difficult because there are so few studies and a relatively large number of parameters (moderators) that could influence the result, such as the magnitude of the differences between the home culture and the host culture (e.g., US/Canada versus US/China), the type and/or level of the assignment, the training methods, and the precise nature of the evaluation criteria.

It is also the case that various individual differences such as personality, cognitive ability, previous experience in the host country, and 'cultural intelligence' (self-rated) can predict subsequent adjustment, satisfaction, and leaving for home early (e.g., see Bhatti et al., 2013b). For example, both openness to experience and emotional stability from the Big Five predict adjustment to the host country. What remains to be investigated is whether such individual differences might interact with different kinds of training experiences. That is, are there useful ATIs?

East Meets West, or Vice Versa

Another parameter that deserves attention results from the growth in the global economy. That is, it is no longer the case that expatriate training issues involve only the US as the home country. Currently, in addition to the US, the two home countries with the greatest number of expatriates on assignment across the world appear to be China and Korea (e.g., see Budworth & DeGama, 2012; Moon et al., 2012; Nam et al., 2013; Wood & Mansour, 2010; Zhang, 2012), and the back and forths between China and Australia are growing. Although this literature is still sparse, the emphasis is on cross-cultural training, as it is for US expatriates, and some major differences between West to East versus East to West cultural adjustments have been noted. For example, the employee ethnic diversity in Western organizations must be understood by expatriates from China and Korea (Holladay & Quiñones, 2005), as well as the Western emphasis on individual performance.

Family adjustments may be easier from East to West because the chance to better learn the host country's language (e.g., English) is more valued than the chance for English speakers to learn better Korean or Chinese. It is also the case that there may be distinct East–West differences in preferences for training methods. For example, Chinese managers may not react well to simulations or case-based group discussions (Branine, 2005). However, research is just beginning on these issues and, as in Western organizations, most Chinese or Korean organizations do not conduct expatriate training, and comprehensive needs analyses are in short supply.

Training New Immigrants

If so little training research has been devoted to high level expatriates in multinational firms, it is probably not surprising that there is virtually no research on the employment training needs of immigrant groups. The sociological and political issues are important and often framed in terms of assimilation versus integration versus isolation (Berry, 1997). Since employment is such a major part of these processes, the training enterprise should have much to contribute, particularly since immigrant flows seem to be on the increase.

As with expatriates, there are many different kinds of immigrant groups ranging from high level professionals seeking better employment opportunities, to unskilled groups seeking any kind of employment at all. The European Union, UK, US, and Canada have large contingents of the second group. Kvist (2012) documents Sweden's effort to provide vocational skills to unskilled immigrants. The Swedish government provides multilevel vocational training ranging from basic language skills to job training in certain broad domains. The effect of such training on employment rates has been substantial. The benefits to the economy far outweigh the costs of the training. At the other end of the occupational continuum, Felker (2011) conducted in-depth interviews with a sample of self-initiated expatriates (SIEs) from Eastern European countries to other EU countries, the UK, and Ireland. All interviewees were university graduates. It was virtually universal that the SIEs had made their move with no knowledge of host country labor markets, job opportunities, or networking opportunities, and they had no job search plans. They were simply dissatisfied with their home country situation and wanted to move. Their situations beg for training opportunities (perhaps self-managed) in how to investigate opportunities and search for potential jobs and careers in the other countries.

In general, immigration for the sake of employment affects many millions of people worldwide. It deserves much more research attention. The increments in human capital that could be achieved if immigrants could somehow avail themselves of well-designed occupational training opportunities is mind boggling. There is not much doubt that the returns to the national economies for such investments would far exceed their costs.

Summary

Based on the evidence we have, expatriate and immigrant training has considerable potential for a very high ROI. However, such training does not occur at a very high frequency. Organizations should do much more. Also, expatriate training, across countries, is almost exclusively focused on cross-cultural adjustment, which is important, but there could be other important training needs as well. Expatriate training could benefit from more systematic and comprehensive needs analyses. Cultural adjustment may not be the only concern.

IN CONCLUSION

As we said in the first edition, occupational training is a critical component of effective human resource management at the organization level, at the national level, and at the global level. Its importance to individuals, to organizations, and to nations simply cannot be overstated. The extant training evaluation literature shows that training can have large effects on knowledge and skill acquisition, and on attitude change.

However, particularly when cast against the magnitude and scope of what the training enterprise is, and should be, the available fund of relevant research, basic or applied, is relatively small. It pales in comparison to research on personnel selection and job attitudes, and yet may have as much, or greater, impact on individual performance, satisfaction and commitment, and on organization performance as well. Research on occupational training should not get such a short stick. However, given what the literature has to offer, we think at least the following summary conclusions are warranted:

- 1 The 'universals' in training design that we described earlier transcend *all* theories, models, methods, etc. of training. They constitute questions or issues that *must* be addressed; and if

not considered explicitly, they will simply be answered by default. Given the looming importance of self-managed learning, it would be good if *everyone* knew them. For example, there will always be needs analyses and learning objectives of some kind. It would be best if they were as explicit and valid as possible.

- 2 Training *does* work, at least as established by end-of-training measures. Transfer to the work setting is another matter, but we now have a better understanding of how to facilitate and support it. It does in fact take place.
- 3 Discussions of twenty-first-century skills are quite muddled. Terms such as 'problem solving' and 'critical thinking' are on everyone's list, but they have very little concrete specification; which is needed if we are going to train people to become better problem solvers and critical thinkers. The hyperbole should end. It must face reality. Speaking of hyperbole, we should also keep in mind that, with the possible exception of information and computing technology skills, the much touted twenty-first-century skills were important in the twentieth century as well. It is their criticality that has changed.
- 4 Training in interpersonal skills still stands as an excellent model of how to specify training needs and objectives explicitly, and then compare alternative methods for addressing them.
- 5 Team training is advancing, but not nearly at the pace it should, given the importance of many different kinds of teams to organizational functioning. It must be careful not to get too bogged down in the proliferation of abstract and difficult to define constructs that hinder, rather than help, training design, although they may satisfy other needs.
- 6 In spite of the lack of a common language across contributors, the critical role of self-regulation has now become clearer and it begs for training interventions probably starting long before the first job. It is a legitimate twenty-first-century skill that needs improvement and facilitation. We could not usefully distinguish self-regulation skill from metacognitive skill. One seems a part of the other. Solve it.
- 7 Expatriate training has advanced a bit, and shows positive effects, although too few organizations use such training. It is also less US-centric, and will become even less so. Welcome to the world.
- 8 We found no *research* literature pertaining to entrepreneurship or to teaching conscientiousness and accountability, (i.e., in some people's terms, the soft skills).

Future Needs

As we have already stated many times, work-related training and learning have a critical role in our future economic well-being. Some of the most critical issues, in our view, are the following:

- Training and learning can certainly happen informally or haphazardly, and things can seem to turn out ok (after all, simply look in the mirror). However, if it is true that there are substantive training needs that have considerable criticality and generality across occupations, organizations, industry sectors, or broad segments of the labor force, then we must make a concerted effort to specify what they are. Constantly listing general abstractions such as problem solving, adaptability, creativity etc. doesn't do it. We need substantive descriptions of such training needs that can be translated into concrete training and learning experiences. This will require much more substantial data collection regarding training needs, using multiple methods, and not just more superficial 'employer surveys'. Let us get down to the actual work itself, and the performance determinants that are domain specific but broadly applicable, and are trainable.
- Training methods, as characterized in this chapter, are always 'faddish' to a certain degree. Witness programmed instruction. Currently 'gaming' is on the rise, for both good and bad reasons. In general, as has been the case in the past, we need much more comparative research on which methods are best for particular areas of content. Again, interpersonal skills training is a model to follow, keeping in mind that goal-centered effortful processing that incorporates optimal practice and feedback is the basic foundational ingredient.
- The ATI is still with us, and it is still the case that the 'aptitude' of greatest importance is still the most neglected. That is, the trainee's pre-training levels of knowledge, skill, or attitudes most likely make a great difference in what the appropriate content of the training program should be, regardless of whether it is externally designed, or self-designed. This is well recognized in general education (e.g., studying calculus versus basic algebra is a function of the student's current state of knowledge). It should be played to greater advantage in occupational training and development as well. (e.g., regarding leadership training, potential trainees could vary widely in terms of their current capacities for providing consideration and support for subordinates or

peers, not to mention their pre-training stereotypes of what leadership is and what 'leaders' should do.)

- Finally, again, it cannot be avoided that trainee motivation is the 1000kg gorilla in the room. We simply need much more research on how best to motivate real people in real training experiences across a wide variety of contexts. The last 15–20 years have produced a reasonable framework for conducting such research. We should use it.

EPILOGUE: A SKILLS GAP? SKILL SHORTAGE? SKILLS MISMATCH?

For several decades there have been dire warnings about the 'skills gap', at least in the United States. That is, there is a gap between the skills that job applicants are able to offer and the skills that employing organizations perceive to be needed; and this gap will grow in the 'future'. The gap is seen as due to a shrinking labor force resulting from 'boomer' retirements, and the failure of the secondary-school, vocational-technical school, and university training systems to produce graduates with the appropriate work readiness, employability, and technical skills. Skill gaps in particular occupations (e.g., STEM) are sometimes referred to as skill *shortages*, which are also attributed to the failure of the vocational-technical and university training systems to anticipate specific occupational shortages; as well as to individuals who do not self-manage their own training well enough. In the US these conclusions have been reached by a wide variety of government and employer funded commissions going back to the 1980s (e.g., SCANS, 1991). A particularly negative critique, and a prediction of huge shortfalls over the next 10–15 years, is provided by Carnevale et al. (2010). A number of consulting firm reports (e.g., Manpower, 2013) support these conclusions. However, other countries do not appear to share the US panic.

As summarized in a detailed review paper by Cappelli (2015), the academic research literature, primarily from labor economists and sociologists (e.g., Levine, 2013, disagrees with these views. That is, there is no skills gap. What appears to be a skills gap results from the following considerations:

- This perhaps will change, but according to Cappelli (2015), there were more job searchers than there are jobs to fill. That is, the supply of labor currently exceeds demand, and has for some time. Wages are stagnant or declining – except for the top 10–15 percent.

- For many jobs, the current job holders are in fact overqualified. For example, very recently, 60% of the parking lot attendants in Wisconsin have a BA degree, or higher (Levine, 2013).
- 'Lifetime' hires by employers have been replaced by more transitory lateral hires. Consequently the average job tenure across the economy has declined significantly.
- Specific in-house training for specific skills, by employers, has declined significantly. When employers report a lack of skilled applicants, they mean individuals with highly specific skill sets that match the requirements of specific jobs. This is a change in what it means to be qualified. The demand for higher level academic skills is, if anything, declining. Employers want specific work experience, along with the specific skills that such experience entails, but school-to-work and apprenticeship programs have declined in frequency, at least in the US. Consequently, it is more difficult to fill open positions, but employers do not seem overly anxious to do so, and wage offers have not gone up.
- The skills gap that perhaps does exist has to do with what economists like to call 'soft' skills. We would call them deficiencies in conscientiousness and motivation.
- Mismatches do occur from time to time between the need for graduates in certain fields and the available supply of such graduates. However, anticipating such occupational trends is not that easy for educational institutions.

Given the above, the McKinsey Global Institute (MGI) (2015) has proposed that a better online system for matching available openings to specific potential applicants (referred to as online talent platforms) would pay big dividends worldwide. It was the topic of a Thomas Friedman column in *The New York Times* on June 10, 2015. MGI estimates that full use of such platforms (if they were expertly designed) would result in a 2% rise in worldwide GDP and improve the lot of over 500 million job holders by 2025. The basic conclusions of MGI are that labor markets are performing very inefficiently, and it will take serious and far reaching innovation to correct the deficiencies. These issues will be argued about for a while.

Where does all this leave the occupational training and development enterprise? We think the following points are relevant:

- If employers essentially eliminate specific skills development as part of their responsibility, then even more responsibility will be placed

on self-managed learning and development. Euphemistically, this is sometimes referred to as establishing a 'learning culture', which encourages more or less constant self-managed training and learning: People who self-manage their own instruction well are more valuable to the organization than those who do not (SHRM, 2015). There also may be more incentives for private, and public, vendors to supply it.

- All potential job seekers must become experts in using all forms of online job-matching platforms.
- The training and development of leadership and management capabilities, as we have characterized them here, should be embedded in virtually all levels of the education system, in all countries, and at all levels of the organizational hierarchy. The twenty-first century *will* demand such capabilities, to a greater extent than the twentieth century.
- The same can be said about self-regulation skills, and team skills, and 'soft' skills.
- The 'international briefings' from almost 36 countries published in the *International Journal of Training and Development* (e.g., Villar et al., 2013) show that most countries recognize the critical importance of vocational education and training to the success of public and private sector organizations and subsequently to the health of the national economy itself. In general, the US does not. We will witness the consequences of this as the years go by.

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Judgment and Decision Making in the Workplace

Don C. Zhang and Scott Highhouse¹

INTRODUCTION

An earlier version of this chapter appeared in the 2001 *Handbook* (Highhouse, 2002). In it, one of us observed that judgment and decision making (JDM) research had ‘exploded’ as a unique area of inquiry within psychology. Although one might discount the violent metaphor as excited hyperbole, it is notable that this was published *before* prominent JDM researcher Daniel Kahneman won the Nobel Prize, before new JDM journals were introduced by the Society for Judgment and Decision Making (i.e., *Judgment and Decision Making*) and the American Psychological Association (i.e., *Decision*), and before a number of scholars and writers across disciplines successfully introduced JDM to the lay public (Ariely, 2011; Ariely & Jones, 2008; Gigerenzer, 2007; Gladwell, 2007; Heath & Heath, 2010, 2013; Iyengar, 2011; Kahneman, 2011; Tetlock, 2006; Thaler & Sunstein, 2008).

Although we can not use the term ‘explosion’ to describe the impact of JDM on industrial and organizational (I-O) psychology since the earlier chapter was published, we have witnessed a minor flare-up. A number of prominent I-O researchers have emphatically encouraged more JDM research in the field (Dalal, Bonaccio, Highhouse, Ilgen,

Mohammed, & Slaughter, 2010), a SIOP Frontiers Series book on JDM was published in 2013 (i.e., *Judgment and Decision Making at Work*), and the number of symposia and poster presentations on JDM topics in the SIOP Conference program has grown exponentially in the last decade or so. Although I-O psychology had historically relied on the idea of the ‘rational man’ to develop utility and expectancy maximization models of behavior such as expectancy theory (Vroom, 1964) and image theory (Beach & Mitchell, 1990), a new breed of I-O scholars have happily embraced the heuristics and biases approach in JDM to explore behaviors that deviate from standard normative models of rationality. This has proven to be fruitful in areas such as personnel selection (e.g., Kuncel, Klieger, Connelly, & Ones, 2013; Slaughter, 2007), performance evaluation (Reb & Greguras, 2010; Wong & Kwong, 2005a), compensation (Kuhn & Yockey, 2003), workplace justice (e.g., Hausknecht, Sturman, & Roberson, 2011), team decision making (Bonaccio & Dalal, 2006), and many more (Highhouse, Dalal, & Salas, 2013). Indeed, even JDM researchers have gotten into the act (e.g., Ariely, Kamenica, & Prelec, 2008; Dana, Dawes, & Peterson, 2013; Ordóñez, Schweitzer, Galinsky, & Bazerman, 2009). It seems the workplace is a fruitful place to study judgment and decision making!

BACKGROUND

Many scholars of the history of decision-making research point to two papers published in the mid-1950s as marking the beginning of JDM as a field within psychology. The first was a review published in *Psychological Bulletin* by Edwards (1954) that exposed psychologists to important work on individual choice in economics and statistics (e.g., von Neumann & Morgenstern, 1945), showing its relevance to the psychology of choice. The second paper by Hammond (1955) was published in *Psychological Review* and showed how principles of perception (see Brunswick, 1956) were applicable to the study of judgment. Although one could point to other works at this time as being equally important and influential in the development of JDM (e.g., Luce & Raiffa, 1957; Meehl, 1954; Simon, 1955), the papers by Edwards (1954) and Hammond (1955) are notable for setting course two independent programs of research within JDM: choice and judgment.

Following the lead of Edwards (1954) and others working at the time on psychological perspectives on economic and statistical problems (see Thrall, Coombs, & Davis, 1954), psychologists concerned with the choice program of research began studying how people make decisions involving uncertain probabilities. The gambling metaphor guided the thinking of these choice researchers, and behavior in the laboratory was compared to axioms of expected utility or models derived from psychophysics. Normative theories served as foils against which actual behavior could be compared. This provided choice researchers with a rich source of null hypotheses, and stimulated a lively program of research aimed at modeling decision-making behavior and cataloguing heuristics and biases (see Kahneman, 1991, for a review).

A second course was set by Hammond (1955) and others (e.g., Meehl, 1954) interested in how people transform information from the environment into judgments about the future. The gold standard for these researchers was not behavior prescribed by a normative theory, but the relationship between prediction and actual outcomes. Hammond (1955) showed how Brunswikian theory was relevant to the task of making inferences from incomplete and fallible cues in the environment. Whereas the gambling metaphor guided the thinking of choice researchers, the perception or 'lens' metaphor guided thinking in the judgment arena. According to this view, people are intuitive statisticians forced to make probabilistic judgments based on their perceptions of how environmental cues relate to one another (see Kuncel et al., 2013, for an application of lens theory to

personnel selection). Studying judgment, therefore, required observing behavior in its natural environment, or in a laboratory situation that faithfully represents relevant aspects of the natural environment (Hammond, 1996).

Although ambitious attempts have been made to integrate choice and judgment research (e.g., Hammond, McClelland, & Mumpower, 1980; Slovic & Lichtenstein, 1971), investigators in the two areas worked in relative isolation from one another for many years. This isolation probably stemmed partly from differences in methods of research, and also from fundamental differences in assumptions about human rationality (Jungermann, 1983). Whereas choice researchers have generally focused on deviations from rationality, judgment researchers have focused more on successful adaptation to the environment. This division is much less apparent in recent years, however, as many decision researchers have moved freely back and forth between choice and judgment. Goldstein and Hogarth commented on this present state of JDM research:

JDM research is not 'paradigmatic'. There is no single, universally endorsed, overarching theoretical framework that researchers use to organize and guide their efforts. Rather, there are a number of schools of thought that identify different issues as interesting and deem different methods as appropriate. In addition, the situation is complicated by the fact that these schools overlap and interact. In fact, many researchers participate in several. (1997: 3)

Compared with I-O psychology, JDM is relatively young. With the normative model as a standard against which decision-making behavior can be compared, the field has enjoyed an enormously fruitful youth. Researchers have drawn from economics, psychophysics, social psychology, and elsewhere to identify a wealth of shortcomings associated with everyday judgment and decision making.

THEMES OF JDM RESEARCH

Two themes have guided much of the research and theoretical frameworks in modern JDM. The first is the *normative* versus *descriptive* distinction; and the second is the *automatic* versus *deliberative* distinction.

Table 20.1 Important milestones in the history of Judgment and Decision Making (JDM)

1950s	• Ward Edwards (1954) defines the domain of JDM in a classic 1954 <i>Psychological Bulletin</i> article • Paul Meehl (1954) publishes the classic <i>Clinical Versus Statistical Prediction</i> • Kenneth Hammond (1955) applies Egon Brunswik's lens model to clinical prediction • Herbert Simon (1955) introduces the concept of 'bounded rationality' • Luce and Raiffa (1957) publish <i>Games and Decisions</i> • Leon Festinger (1957) presents the theory of cognitive dissonance
1960s	• Ellsberg paradox (1961) stimulates interest in psychology of ambiguity • Allen Parducci (1966) introduces range-frequency theory • James Stoner (1968) introduces the risky shift phenomenon (the initial impetus for the broader group polarization phenomenon) in group decision making • Amos Tversky (1969) publishes 'Intransitivity in preferences.'
1970s	• Barry Staw (1976) introduces escalation of commitment • Janis and Mann (1977) publish <i>Decision Making</i> • Kahneman and Tversky (1979) introduce prospect theory • Robyn Dawes (1979) publishes the 'The robust beauty of improper linear models'
1980s	• First JDM meeting is held in 1980 • Richard Thaler (1980) introduces mental accounting • Nisbett and Ross (1980) publish a classic book on social inference • Norman Anderson (1981) introduces information integration theory • Kahneman, Slovic, and Tversky (1982) publish the classic <i>Judgment Under Uncertainty: Heuristics and Biases</i> • Naylor (1985) changes the name of his journal to <i>Organizational Behavior and Human Decision Processes</i> • Society for Judgment and Decision Making (SJDM; http://www.sjdm.org) is established in 1986 • Calderwood, Crandell, and Klein (1987) define the field of naturalistic decision making • <i>Journal of Behavioral Decision Making</i> introduced in 1988 • Robyn Dawes (1988) publishes 1st edition of <i>Rational Choice in an Uncertain World</i>
1990	• Gerd Gigerenzer (1991) challenges heuristics and biases paradigm • Max Bazerman (1991) publishes 1st edition of <i>Judgment in Managerial Decision Making</i> • Tetlock (1991) introduces 'people as politicians' perspective on JDM • Shafir, Simonson, and Tversky (1993) introduce reason-based choice • Klein et al. (1993) publish <i>Decision Making in Action</i> • Scott and Bruce (1995) publish a measure of decision-making styles
2000s	• Daniel Kahneman wins Nobel Prize in Economics in 2002 • SJDM open-access journal <i>Judgment and Decision Making</i> introduced in 2006 • Blackwell <i>Handbook of Judgment and Decision Making</i> published in 2007

Reprinted with permission from Highhouse, Dalal, & Salas (2013).

Normative Versus Descriptive

The normative versus descriptive distinction is as old as the field itself. Normative models describe how rational decisions ought to be made. The normative model of rationality derives from economic models. As such, the normative perspective focuses on exploring when and how people deviate from that standard. On the other hand, descriptive theories are concerned with creating models that describe how people actually make decisions (Bell, Raiffa, & Tversky, 1988). The normative and descriptive distinction has led to a large body of research demonstrating how people deviate from normative models such as the subjective expected utility (SEU). Scholars developed descriptive theories such as prospect theory, decision field theory, and support theory to model how people's actual decisions

deviate from the normative standard of rationality (Busemeyer & Townsend, 1993; Kahneman & Tversky, 1979; Tversky & Koehler, 1994).

Automatic Versus Deliberative

A second theme that has emerged in the field is the automatic versus deliberate systems of decision making (Kahneman, 2011; Stanovich, 1999). The dichotomy between automatic and deliberate psychological systems has a long history in psychology. This framework can be found in perception, reasoning, and learning (James, 1890/1950; Johnson-Laird, 1983; Sloman, 1996), as well as attitudes and persuasion (Chaiken, 1987; Petty & Cacioppo, 1986). This dual-system approach proposes that

decisions can either be quick, automatic, and effortless (System 1); or they can be slow, deliberate, and effortful (System 2) (Kahneman, 2002, 2011). This dichotomy has led to a large body of research examining the different decision processes and outcomes of these two systems.

In the following pages, we review some of the major topics that have occupied JDM researchers in recent years and along the way, we will discuss how these topics relate to the workplace. We encourage readers to ask these questions: (1) what is the proper way to make a decision in the workplace and how do people actually make these decisions? and (2) when should decision makers be decisive (System 1) and when should they be more purposeful (System 2)?

HEURISTICS AND BIASES

Herbert Simon (1955) first proposed the theory of bounded rationality in response to the fallibility of human reasoning. He challenged the conventional normative models that theorized rational choice based on an exhaustive analysis of all the options. Simon suggested that decision makers, on the contrary, do not typically optimize their decisions; instead, they will often seek a satisfactory choice because they are bounded by their cognitive capacities. The term 'satisfice' was coined by Simon to describe a decision-making strategy that strives for adequacy, rather than optimality. People generally satisfice, according to Simon (1958), 'because they have not the wits to maximize' (p. 62). Simon's ideas about bounded rationality had a profound impact on how psychologists think about decisions to this day (Katsikopoulos & Lan, 2011).

The heuristics and biases research program is one of the most influential to have come out of the bounded rationality paradigm (Tversky & Kahneman, 1975). A heuristic is a mental shortcut that is intended to make decisions under limited information and cognitive resources (Gilovich, Griffin, & Kahneman, 2002). Heuristics are used to make decisions quickly and effortlessly. They are, however, error-prone and can lead to various systematic errors known as biases. Heuristics fall in the camp of System 1 reasoning, as they require little cognitive effort and thought. For example, the *representativeness* heuristic involves making judgments about likelihood based on the degree to which a situation resembles other situations ('all the best job candidates in the past had a great handshake, therefore a great handshake must be an indicator of a great job candidate'). Another heuristic, called *availability*, involves making estimates

based on instances easily available in memory ('the employment prospect must be poor because a lot of my close friends are still unemployed'). Finally, *anchoring and adjustment*, is used when making various predictions about uncertain values. For example, when asked to predict the mean salary of the employees, one would first have to identify a plausible or comparable value as an anchor, and then adjust upward or downward from that anchor based on other relevant information ('My friend Tim makes \$40,000, and he is an entry-level employee, so the mean salary of all employees must be a little higher than \$40,000').

Although heuristics make judgments easy, they are prone to errors of probability and logic. Representativeness can be problematic when individuals fail to account for base rate information. This error is commonly known as base rate neglect (Bar-Hillel, 1980). Using our example above, while successful job candidates in the past may have had great handshakes, it does not necessarily mean that a handshake is diagnostic of a great candidate. The failure to account for this information when making the judgment is explained by the availability heuristic. The availability heuristic takes advantage of memories and experiences that are emotionally salient. In the previous example, information about a poor candidate who had a great handshake is difficult to retrieve; therefore, it is ignored in the judgment process. Anchoring effects can arbitrarily influence decisions. Simonson and Drolet (2004) asked a group of students to think of a random numerical anchor: their social security number (SSN). Next, the researchers asked the students to indicate their willingness to pay (WTP) on various items presented. Results showed the students' WTP for the item was significantly related to their social security number such that individuals with a higher SSN indicated a higher WTP than individuals with a lower SSN.

Heuristics and biases is one area of JDM that has received modest interest from the I-O community. For example, Marlowe, Schneider, and Nelson (1996) suggest the use of representativeness heuristic may be responsible for the infamous 'glass ceiling' between women and the executive suite. Hinsz, Kalnbach, and Lorentz (1997) showed how the anchoring effect could be used to establish challenging self-set goals. Thorsteinson, Breier, Atwell, Hamilton, and Privette (2008) found when irrelevant anchors were added to a rating scale, it had a significant impact on the final performance ratings. Heuristics are necessary to make decisions quickly and efficiently. However, as demonstrated here, they are prone to errors and I-O psychologists need to be aware of these errors in workplace decisions.

RISK AND UNCERTAINTY

Cognitive Perspectives

Definitions of risk may vary from a focus on personal harm, found in medical and hazard research, to emphasis on possible opportunities, found in economic and business literatures. Decision makers are said to be risk averse if they prefer a sure thing to an option whose outcome is uncertain (i.e., a risky option). Consider a newly hired sales employee, named Susan; Susan is fresh out of college and is faced with a choice between a sure salary of \$75,000 per year or a commission having 80% chance of earning \$100,000 per year. If she is like most new college graduates, she will likely choose the sure salary. Susan would be considered risk averse with this choice, however, because the uncertain commission has a higher expected value ($.80 \times \$100,000 = \$80,000$) than the sure salary of \$75,000.

It has long been known that people do not operate on pure expected value. In fact, as early as 1738, Bernoulli suggested people use subjective utilities in place of dollars for these kinds of decisions. Bernoulli's (1738/1954) hypothetical utility function proposes that subjective utilities are non-linearly related to dollar amounts. For example, this decelerating utility function suggests there is more psychological difference between \$1,000 and \$2,000 than between \$10,000 and \$11,000. This explains risk aversion such that Susan will be willing to forego the additional \$25K offered with the commission in order to have the sure \$75K salary. The incremental utility of going from \$75K to \$100K is no match for the excitement of going from \$0 to \$75K!

Despite the general tendency to be risk averse, there are situational factors that promote the opposite. People faced with options having negative consequences, for example, will often choose the riskiest option. Consider that irregularities were found in our friend Susan's tax statements. Her tax advisor gave her a choice between *paying* \$7,000 in taxes now, or trying a risky (albeit legal) alternative having an 80% chance of losing \$10,000 and 20% chance of losing \$0. In this situation, Susan chooses the risky option. Note, however, that this option has a more negative expected value ($.80 \times -\$10,000 = -\$8,000$) than the sure option ($-\$7,000$). Kahneman and Tversky (1979) would explain Susan's transformation from cautiousness to risk seeking as resulting from a tendency to evaluate outcomes differently whether one is looking to avert losses or add to gains. Figure 20.1 shows the hypothetical utility function proposed by Kahneman and Tversky's (1979) prospect theory.

Note that the upper right-hand (gain) quadrant is no different from the Bernoullian function, but that the lower-left (loss) quadrant reveals an accelerating utility function. People who have experienced gains are expected to view additional gains as having less incremental utility than people who have experienced losses. Thus, risk aversion is expected for gains, but risk seeking is expected for losses.

What does all of this have to do with decision making in organizations? For one, it suggests that organizational decision makers may take great risks to recoup real or perceived losses. Shefrin and Statman (1985) noted, for example, that financial investors have a tendency to 'sell winners too early and ride losers too long'. In other words,

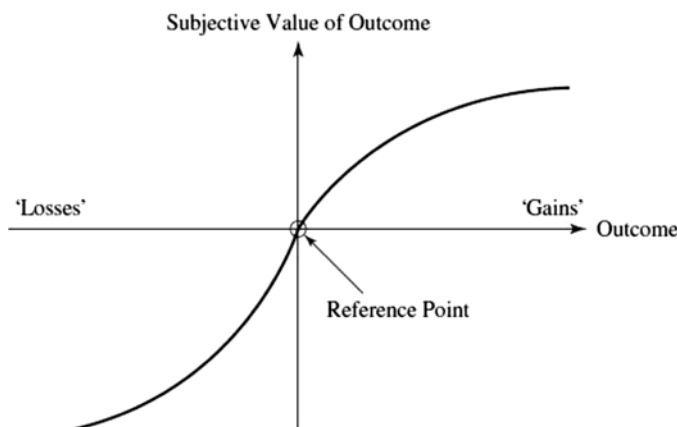


Figure 20.1 Hypothetical utility function proposed by Kahneman and Tversky (1979)

when an investment has gained in value, investors often forego future possible gains by getting out too quickly. Also, when an investment has fallen in value, investors will often hope for an upturn and risk further loss rather than accepting the certain loss (Moore, Kurtzberg, Fox, & Bazerman, 1999).

Sunk Cost Effect

The observed tendency to take unwarranted risks in order to recoup or avoid losses is related to the well-known sunk cost effect (Staw, 1997). The sunk cost effect is a tendency to persist in an activity because of previously invested effort, time, or money. This tendency violates the economically rational principle that people should ignore sunk costs and focus only on incremental costs when making future investment decisions. Staw (1981) argued that people fall prey to sunk costs in order to justify past decisions. Arkes (1996) suggested that another reason people fail to ignore sunk costs is that they overuse a 'don't waste' heuristic that serves them well in other life contexts. For example, Arkes presented people with a vignette describing a company developing a material to be used in camping tents, only to find out that a competitor began marketing a superior product. People recommended abandoning the sunk cost in material development when told the material could be sold to a roofer for \$5,000 but not when the material was to be sold as scrap for the same price. In the latter instance, people preferred to honor the sunk cost rather than engage in a 'wasteful' act. The sunk cost fallacy also leads to escalation of commitment, which is associated with the colloquialism: 'throwing good money after bad'. Slaughter and Greguras (2009), for example, found that judges who were initially involved in hiring someone were more inclined to later give a positive performance evaluation to that person.

Endowment Effect

Another product of loss aversion is the endowment effect. The endowment effect describes one's tendency to view objects as more valuable when it is in their possession (Brenner, Rottenstreich, Sood, & Bilgin, 2007; Kahneman, Knetsch & Thaler, 1991). The reference point in the value function refers to the current state of affairs, which is what you already own (Figure 20.1). As circumstances change, the reference point of the value function changes as well. One can invoke the endowment effect in predicting how people react to different performance-contingent bonuses.

For example, a \$5000 bonus for meeting a quota is different from taking away \$5000 for NOT meeting the quota. When the \$5000 is already in possession of the employee, taking that away will cause a lot of distress because taking away something from one's possession leads to a loss while adding asset of the same value (\$5000) is considered a gain from the referent point.

The endowment effect is a powerful phenomenon that has real-life consequences. When a company is designing a performance-based bonus system for their salesperson, it could take advantage of principles of loss aversion to affect behavior. Instead of giving the salesperson cash bonuses in exchange for units sold, the company can set up a scenario of loss aversion where a bonus is paid up front, and for every unsold unit, the company would then deduct the bonus from the employee. The act of taking money away from an employee after it is already in their possession triggers a strong sense of loss aversion. Therefore, the salesperson may be more motivated to prevent any loss of their current salary due to the endowment effect. However, in practice, one must also consider the reactions of the employees. The pain of loss can work both ways. While taking money away can be highly motivating for performance, it may also lead to negative employee reactions and lower job satisfaction (Meza & Webb, 2007).

Dimensions of Uncertainty

Researchers in JDM have long been interested in different modes of uncertainty (Fox & Ülkümen, 2011; Kahneman & Tversky, 1981). Consider this statement by then President of the United States, Barack Obama:

As outstanding a job as our intelligence team did ... at the end of the day, this was still a 55/45 situation.... We could not say definitively that bin Laden was there. (2011)

President Obama's judgment of the situation in capturing Osama bin Laden involved two types of uncertainties. The first is whether or not bin Laden was in the compound. This type of uncertainty is associated with the lack of information and intelligence regarding the whereabouts of bin Laden. The second type of uncertainty is associated with the stochastic nature of our world. There is an unpredictable, random process that influences whether or not the extraction of bin Laden would be successful if it was carried out multiple times.²

Uncertainty is prevalent in many work-related judgments. Personnel selection is still an issue

laden with uncertainty and unpredictability. Highhouse (2008) argued that the business of personnel selection involves considerable irreducible complexity and there is a limit to what we can predict about a person at the time of hire. The combination of our best predictors can only predict up to about 30% of the variance in job performance (Schmidt & Hunter, 1998). The uncertainty in personnel selection is whether an incumbent will perform effectively on the job in the future. Similar to the uncertainty in the success of the mission to capture bin Laden, uncertainty in future job performance can also take on two forms. The first type of uncertainty is the insider's perspective of uncertainty. For example, the hiring manager may have some internal judgment that represents his personal belief based on his knowledge and information. The information and expertise – be it expert intuition or score on a cognitive ability test – allows the manager to reduce some uncertainty about the future prospect of the applicant. The uncertainty regarding the future performance of his applicant reflects the hiring manager's lack of confidence. This type of uncertainty is called *epistemic uncertainty*. The confidence judgment may be capped by the amount of knowledge and experience the manager has, but it is also capped by the amount of variance that is knowable. The unknowable variance is the second type of uncertainty. This uncertainty is related to the stochastic nature of the world, and in this instance, human performance. If the hiring manager were to hire 50 employees on the job, all of whom share the same attributes; some of these employees will become successful while some others will fail by random chance. This is the type of uncertainty involved in predicting the outcome of a coin toss; outcomes can be random under the same starting conditions. This type of uncertainty is called *aleatory uncertainty*.

The two variants of uncertainty are associated with different mental processes. For instance, Howell and Burnett (1978) found that people perceive that they have some control when the events are internal, but they have no control when they are external. Different attribution of the source of uncertainty can also lead to different strategies to reduce that uncertainty. For example, epistemic uncertainty can be reduced by increasing expertise and search for more information, while aleatory uncertainty can be managed by determining the relative frequencies of the events (Fox & Ülkümen, 2011). Our natural language has different ways of describing the two types of uncertainty. Epistemic uncertainty is often expressed by describing one's confidence (e.g., 'I'm 50% sure'); while aleatory uncertainty is expressed with phrases referring to some element of randomness (e.g., 'There is a 50% chance') (Hacking, 1975). Traditionally, I-O

psychologists have viewed uncertainty as a unitary statistical concept. However, research in JDM has demonstrated that uncertainty takes on different forms and can lead to different mental processes. And as a result, can lead to different judgments of uncertainty, probability, and confidence.

PREFERENCES

The study of preferences is central to human judgments and decisions. Hiring managers must decide whether to hire Candidate A or Candidate B. Job candidates must decide whether to accept a job with lower pay and short commute or a job with higher pay but a long commute. The normative model of rationality assumes that preferences follow a set of probabilistic and logical axioms. These axioms derive from traditional economics and are still used to model consumer preferences and economic behaviors (Richter, 1966). The first axiom, invariance, states that individual preferences are stable and do not depend on the description of the options (descriptive invariance) or the method of elicitation (procedure invariance). This assumption leads to a series of logical deductions about human preference. For example, if John is preferred over Sue, and Sue is preferred over Dan, then John is necessarily preferred over Dan. This order of preference should hold in all contexts and scenarios such that no method describing the scenario should change one's order of preferences. Although this may seem trivial, research in preferences has shown that this normative law of preference does not hold up under scrutiny. Rather than assuming a stable preference, a large body of research has shown that preferences are actually constructed at the time of eliciting that preference (Slovic, 1995).

Context Effects

If John is preferred over Sue, and Sue is preferred over Dan, then one should expect the presence of Dan to have no bearing on the preference toward John or Sue. In other words, since Dan is the least preferred option out of the three, whether or not it is a viable option should not affect people's preference toward John or Sue. Violation of this basic principle would indicate a major flaw in human rationality because people's preferences are being affected by irrelevant options. One of the most robust context effects in JDM is the (non-dominating) decoy effect.

Table 20.2 Ratings for candidate and decoys in Highhouse (1996)

	<i>Work Sample Rating</i>	<i>Promotability Rating</i>
Candidate 1	5	80
Candidate 2	7	66
Decoy Candidate ^a	4	80
Decoy Candidate ^b	7	54

The decoy effect occurs when an inferior option makes one of the similar alternatives appear more attractive (Dhar & Simonson, 2003; Mishra, Umesh, & Stem, 1993). For example, John and Sue may both be highly qualified but differ on some traits. John is highly motivated but lacks the quantitative abilities; Sue is high in her quantitative abilities but does not have the same level of motivation as John. When these two candidates are compared side by side, the preference for the two may be similar. However, if we introduce a third option: Tom, who is similar to Sue on quantitative ability but slightly lower in motivation; the attractiveness of Sue is raised because the presence of a similar but inferior option (Tom) makes Sue appear more attractive. Attraction has also been called the decoy effect, where the inferior option acts as the 'decoy' to make another similar option appear better. This effect has been explored extensively in I-O psychology (see Reb, Greguras, Luan, & Daniels, 2013; Slaughter & Kausel, 2013). Consider Table 20.2, from Highhouse (1996), using a simulated employee-selection scenario.

Participants in this study were presented with two comparable job finalists and one decoy candidate, along with work samples and promotability ratings. Participants receiving Decoy Candidate^a, along with the choice pair of Candidate 1 versus Candidate 2, preferred Candidate 1 by nearly a 3 to 1 ratio. In contrast, participants receiving Decoy Candidate^b with the same choice pair preferred Candidate 2 in nearly the same proportion. Slaughter, Sinar, and Highhouse (1999) found that this effect could occur even when decision makers are not given explicit numerical values for attributes, but are simply provided with visual performance information. Furthermore, Slaughter, Bagger, and Li (2006) found that the decoy effect is robust even in group decision-making contexts.

General evaluability theory (Hsee & Zhang, 2010) was developed to explain context-dependent inconsistencies in preferences. The theory suggests that value sensitivity depends on presentation mode (isolation vs. comparison), attribute knowledge (poor vs. rich), and attribute nature (inherently inevaluable vs. inherently evaluable). For example, Bazerman, Schroth, Shah, Diekmann, and Tenbrunsel (1994) presented MBA

students with two jobs: the first pays \$70,000 while coworkers are paid \$50,000; and the second job pays \$80,000 while coworkers are paid \$100,000. MBA students preferred the job with the highest absolute salary when both options are presented simultaneously; but their preference is reversed when the two options are presented independently. When the two choices are presented simultaneously, the subjects compared the absolute salaries. But when the choices are presented separately, the subjects compared the absolute salary to the coworkers' salary; therefore, \$80,000 no longer appears attractive compared to the \$100,000 salary that the coworkers are earning. Tenbrunsel and Diekmann (2002) explored the decoy effect further in a job choice context. They found when the choices are all similar in terms of attractiveness; the participants were more likely to pick the job that was clearly better than a decoy 'choice'. Similarly, Slaughter and Highhouse (2003) examined how attribute salience affects job preferences. For example, when only one alternative, the choice set has an advantage in a particular attribute (high salary), and that attribute is weighed more heavily when forming preferences about jobs. Previous research on contexts effects has shown that people weigh attributes differently based on the surrounding choices. The designs of context effect studies, however, are often limited to only a few job attributes, and less emphasis is given to the nature of the attributes themselves. Job choice research has shown that applicants use a large array of cues when making judgments about the attractiveness of job prospects such as the recruiter's behavior, perceived person-job fit, and the recruitment process itself. Stevens (2013) presents a review of the job choice literature over the last decade, and suggests many opportunities for job choice researchers to integrate decision theory.

Information Presentation Effects

How information presentation influences decision making is a topic that has occupied social psychologists and human factors engineers for decades. More recently, a considerable body of research has emerged in JDM on information

presentation effects on judgment and choice. One stream of research has been concerned with the *semantic framing* of options, while another stream has focused on the *display* of information in decision-making contexts. These are discussed in turn.

Semantic Framing

The way in which information is worded has long been known to influence people's perceptions. McKenzie and Nelson (2003) suggest that semantic frames are different linguistic representation of information that are logically equivalent (25% die vs. 75% live). For example, Harris (1973) found that people who were asked 'How short was the basketball player?' estimated lower heights than people asked 'How tall was the basketball player?' Semantic framing is also used to ask similar questions differently. Loftus (1975) found when asked 'Do you get headaches frequently?' people reported more headaches than people asked 'Do you get headaches occasionally?' Wong and Kwong (2005b) presented judges with work attendance information of employees. The judges perceived a greater difference between two workers when the performance was framed as absence rates (e.g., 2% vs. 5%) compared to when it was framed as attendance rates (98% vs. 95%).

The framing of a dilemma as either a chance to recoup losses versus a chance to realize gains has been reliably demonstrated to influence people's risky choices (see Kühberger, 1998 and Levin, Schneider, & Gaeth, 1998 for reviews). For example, when people are given a choice between a sure loss (e.g., eliminate 4,000 of 6,000 jobs) versus a small probability of no loss (e.g., 1/3 chance of keeping all 6,000 jobs and 2/3 chance of eliminating all 6,000), they tend to choose the one with a small probability of no loss. However, when the same dilemma is framed as a choice between a sure partial gain (e.g., save 2,000 jobs for sure) versus a small probability of a complete gain, people tend to opt for the sure win (Bazerman, 1984; Zickar & Highhouse, 1998). This pattern of choice is predicted by prospect theory.³

Levin et al. (1998) noted that much confusion has been caused by researchers indiscriminately using the term 'framing' to describe very different types of semantic manipulations. Consider, for example, a study by Dunegan (1993) finding that members of an international company gave lower evaluations to a project team when it was described as having a 40% *failure* rate than when it was described as having a 60% *success* rate. Clearly, risk taking was not an issue in this study, and prospect theory sheds little light on the processes underlying this semantic manipulation

effect. Levin et al. (1998) referred to this type of manipulation as *attribute framing*. This type of framing occurs when a single attribute within a given context is the subject of the framing manipulation. Examples of attribute framing in I-O contexts have included a study showing that lay-off survivors evaluate companies more favorably when information emphasizes the criteria used to keep rather than dismiss employees (Brockner, Wiesenfeld, & Martin, 1995), and a study showing that decision makers evaluate a placement program more favorably when its success rate is emphasized than when its failure rate is emphasized (Davis & Bobko, 1986).

Another type of framing effect identified by Levin et al. (1998) is *goal framing*. Goal framing studies are commonly used in the persuasion literature, and involve the semantic manipulation of information to focus attention on obtaining a benefit or gain (positive frame) or on avoiding a harm or loss (negative frame). For example, Ganzach and Karsahi (1995) found that prospective credit card customers were influenced more by a message that emphasized losses from *not* using a card than by a message that emphasized the gains from using one. Note that both conditions promoted the same behavior in this study (i.e., using the credit card). Thus, the question in goal framing studies is which frame has the most persuasive impact for achieving the same end result. Although goal framing studies have been rare in I-O psychology, Hazer and Highhouse (1997) found that some managers were more influenced by utility analysis information when the costs from not implementing a selection program (vs. the gains from implementing a selection program) were emphasized. Certainly this work could be extended to other I-O arenas concerned with influence and persuasion, such as leadership or recruitment.

Information Display

In addition to the effects of semantics on choice, there has also been a recent flurry of activity in JDM on the effects of physical information displays on judgments. This research is concerned with the format (e.g., frequencies vs. percentages; by attribute vs. by dimension; numerical vs. graphical) in which attribute information is presented to decision makers charged with making judgments and choices (e.g., Gigerenzer & Hoffrage, 1995; Kirkpatrick & Epstein, 1992; Schkade & Kleinmuntz, 1994; Wells, 1992). Payne, Bettman, and Johnson (1992) recommended that information display be used proactively to facilitate normatively appropriate decision making. This was the theme behind Russo's (1977) early work

on consumer decision making in which he was able to induce supermarket customers to purchase products with lower prices by gathering unit price information and presenting it on a single list.

Information display choices can affect workplace practices in many ways. For instance, the practice of individual assessment usually involves having a third-party consultant collect and disseminate information about a job finalist. This information could include, for example, personality profiles, interview performance, and cognitive ability test results. How this information is reported back to the decision makers in the organization could have important effects on how the information is utilized by the client (see Highhouse, 1998). For example, Senter and Wedell (1999) presented information about apartments either by dimension (i.e., all apartments compared under one dimension) or by alternative (i.e., all dimensions compared under one apartment), and compared responses to a baseline of behavior under unconstrained searches. Their results indicated that, when information was presented by dimension, the decision process was less effortful and closer to 'unconstrained' decisions than when information was presented by alternative.

More recently, researchers have examined the advantages of visual aids in the domain of risk communication. Several studies used graphical representations of probabilistic and frequency information using a graphic generation program called Icon

Array (Brewer, Richman, DeFrank, Reyna, & Carey, 2012; Galesic, Garcia-Retamero, & Gigerenzer, 2009; Garcia-Retamero & Galesic, 2009). Figure 20.2 shows an example of an Icon Array representation of risk. Icon Arrays have proven to be successful in communicating statistical information to a statistically naïve audience. The graphical representation of risk highlights the base rate of events, thus compensating for the common bias of base rate neglect (Lovett & Schunn, 1999). Base rate neglect is when people only pay attention to the numerator of a fraction and ignore the denominator (base rate). For example, in the statement '50 out of 1000 people fail to improve after treatment', people tend to focus on the 50 and disregard the 1000. In using the Icon Array, researchers were able to improve the understanding of risk information in various health scenarios to a low numeracy audience (Garcia-Retamero & Galesic, 2009).

Researchers have also examined different methods of describing quantitative information related to personnel selection decisions. More often than not, managers in charge of making personnel selection decisions are not well-informed on the validity of various selection instruments. Furthermore, it is difficult to overcome one's reliance on intuition or expertise (Colbert, Rynes, & Brown, 2005; Highhouse, 2008; Rynes, Giluk, & Brown, 2007). Early efforts of communicating the utility of organizational interventions focused on translating effect sizes into monetary gains such as the utility

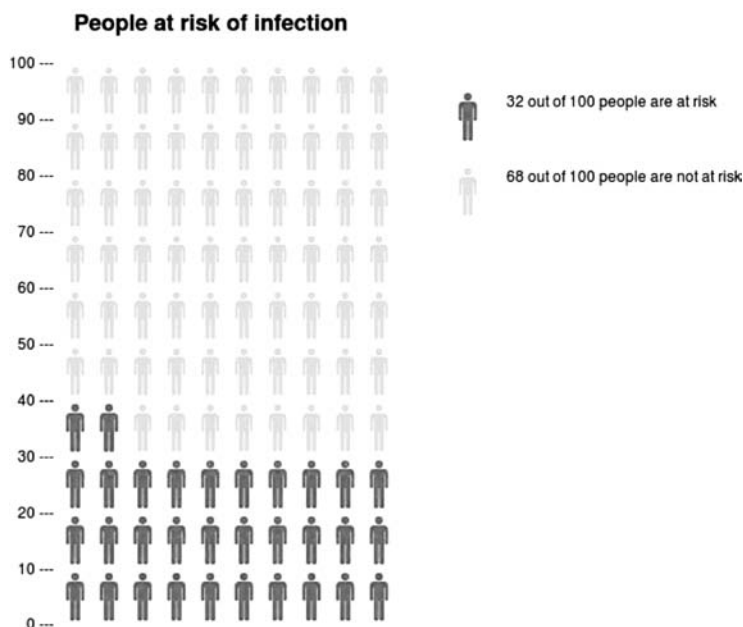


Figure 20.2 Example of Icon Array representation of risk

analysis. Utility analysis provides the utility of a particular tool (e.g., Structured interview) in terms of monetary gain (e.g., \$5000 per hire). Researchers found, however, that managers were often negative or indifferent toward the resulting values (Latham & Whyte, 1994; Macan & Highhouse, 2004; Sturman, 2000). On the other hand, some scholars later argue that the initial disinterest toward utility analysis has to do with its credibility and mode of presentation (Carson, Becker, & Henderson, 1998; Skarlicki, Latham, & Whyte, 1996). Carson et al. (1998) found that utility analysis is more likely to be accepted if it is presented in a user-friendly manner. Macan, Lemming, and Foster (2012) also found that managers are generally in favor of having utility analysis as part of their decision-making process provided that the computational process is explained adequately.

More recently, researchers have focused on examining alternatives to traditional effect sizes indices to communicate validity information to decision makers (e.g., Brooks, Dalal, & Nolan, 2014). Traditional numerical indices of statistical information such as the correlation or coefficient of determination are insufficient at communicating validity information (McGraw & Wong, 1992). Many of these statistics also downplay the utility of the selection instruments. Recent studies have examined using more intuitive metrics of communicating correlations and highlighting its value. For example, Brooks et al. (2014) used common-language effect sizes to transform correlations (e.g., $r = 0.3$) into probability statements such as saying: 'If you attend the Academic Aces GRE Program, there is a 60% chance that you will increase your GRE score more than someone who did not attend the program'. By transforming statistical information into more context-specific descriptions based on probability and frequency, they were able to improve understandability, perceived usefulness, and effectiveness of the training program. Convincing managers to use technologies for reducing decision error (e.g., structuring interviews, combining assessment data using formulas) has long been a challenge to I-O psychologists, and effective description and representation of statistical information can be the first step in bridging the gap between scientists and practitioners.

EMOTIONS IN DECISION MAKING

Models of decision making have placed considerable focus on cognitive mechanisms (e.g., Prospect Theory). In the past decade, the field of JDM has recognized the importance of affect and emotion in decision processes (Loewenstein,

Weber, Hsee, & Welch, 2001; Loewenstein & Lerner, 2003; Rottenstreich & Shu, 2004; Weber & Johnson, 2009).

Two types of emotions affect judgment and choice. The first is immediate emotions and the second is anticipated emotions. Immediate emotions are ones that affect the judgment and decision process. The risk-as-feelings hypothesis suggests that affective reactions affect one's judgment of risk and uncertainty independent of the cognitive evaluation (Loewenstein et al., 2001). Along the same lines, Schwarz (2001) suggested that experienced emotions are processed as information for making judgments and decisions. Slovic, Finucane, Peters, and MacGregor (2007) found when people are in a good mood, they perceive risky activities such as skiing as less risky and more beneficial; Au, Chan, Wang, and Vertinsky (2003) found financial market traders made more risky trades and were more overconfident when in a good mood; and they made more conservative trades when in a bad mood, which resulted in better performance.

Emotions affect judgments differently depending on situational variables. Emotions that are similar on valence and intensity may lead to different behaviors across contexts (Ellsworth & Scherer, 2003). Lerner and Keltner (2001) found that fear and anger affected risk perception in opposite directions: fear increased risk estimates while anger decreased it. Lerner, Gonzalez, Small, and Fischhoff (2003) surveyed a large sample of Americans about their attitude after the 9/11 attack on the World Trade Center; they found that trait anxiety (feelings of fear) led to higher perceived *risk* of a terrorist attack than those high on desire-for-vengeance (feelings of anger). Finally, emotions also play a central role in how people assign values to objects. For example, Hsee and Rottenstreich (2004) asked individuals how much money they would donate to save a panda. People pledged more money when the pandas were represented as cute, fuzzy creatures than when simply represented as black dots.

Anticipated emotions are emotions that occur after a decision is made; but they can also affect the decision process. People often anticipate post-decisional emotions by making counterfactual comparisons (Mellers, Schwartz, & Ritov, 1999). For example, one may ask: 'How would I feel if I quit my job compared to if I had stayed?'. Counterfactual thinking can lead to various anticipated emotions such as: regret, disappointment, and anxiety (Coricelli, Critchley, Joffily, O'Doherty, Sirigu, & Dolan, 2005; Schwarz, 2000; Zeelenberg, 1999). Anticipated emotions can lead to negative outcomes such as indecision (Anderson, 2003). Anticipated regret has been shown to be one of the key factors in why people

fail to make decisions or consciously choose to delay a decision. When provided with multiple choices, people anticipate the regret associated with choosing one of the options and being incorrect to be much greater than the choice to simply defer the decision. This phenomenon is called the omission bias (Baron, 1992; Ritov & Baron, 1995; Zeelenberg, 1999). The degree to which individuals experience anticipated regret can be influenced by a number of factors. If the outcome of the decision is irreversible, such as hiring a job candidate, then there is higher anticipated regret (Zeelenberg, Beattie, van der Pligt, & de Vries, 1996). On the other hand, if the hiring manager is told that there would be a trial period of the employee and the decision can be reversed, then the hiring manager may be more willing to make a definitive decision. Decisiveness is often the hallmark of a good manager. It is important to understand the mechanisms that lead to indecision and improve the efficiency of high-stakes decisions (Brooks, 2011). Some researchers have started examining emotional intelligence in the workplace, which is defined as competencies related to self-awareness, impression management, and social awareness (Goleman, 1998). The dichotomy between traditional intelligence and emotional intelligence resembles the analytical and intuitive dichotomy in decision making. Yet, there is little research that examines how emotional intelligence is related to decision outcomes.

INDIVIDUAL DIFFERENCES IN DECISION MAKING

Individual differences is perhaps the fastest growing area of JDM research. Recent work has started to examine various traits related to how people make decisions across domains (Mohammed & Schwall, 2009). Moreover, the Decision Making Individual Differences repository (<http://www.sjdm.org/dmidi/>) has made research in the area more accessible (Appelt, Milch, Handgraaf, & Weber, 2011). In the following section, we will address some of the key individual differences in decision making as they relate to workplace behaviors and decision outcomes.

Attitude Toward Risk

Many professions require risk assessment and risk management skills (e.g., entrepreneurs, risk analysts, mutual fund managers; Stewart & Roth, 2001).

One of the major recent undertakings in measuring individuals' risky tendencies is the Domain-Specific Risk Taking Scale (DOSPERT) developed by Weber, Blais, and Betz (2002). The DOSPERT measures risk taking attitudes by assessing (a) risk perceptions and (b) risk behaviors. The scale measures these things in five different risk domains: (1) ethical, (2) financial, (3) health/safety, (4) recreational, and (5) social. Despite its short existence, the DOSPERT is highly popular and widely used (e.g., Hanoch, Johnson, & Wilke, 2006; Weller & Tikir, 2011). The DOSPERT predicts risk behavior in various domains such as stock-trading (Markiewicz & Weber, 2013), gambling (Mishra, Lalumière, & Williams, 2010), and unhealthy sexual behaviors (Szrek, Chao, Ramlagan, & Peltzer, 2012). The domain-specificity theory of risky behavior would suggest the assessment of risk must be job and domain specific. For example, if a specific job has potential safety hazards and it is important for the employees to avoid risky situations, the selection tool must assess risk-propensity within that risk domain. On the other hand, some jobs may encourage some risk taking; for example, a hedge fund manager has to be able to make critical decisions that may result in loss of the clients' assets.

Although the DOSPERT met an important need in the measurement of risk as a disposition, it has come to symbolize a belief among many in the decision-making community that there is no general disposition toward risk (e.g., Figner & Weber, 2011; Fox & Tannenbaum, 2011). The position that risk cannot be assessed as a general trait, but must be assessed as a situation-specific trait, is inconsistent with research in the personality assessment literature. Indeed, there is no disputing the idea that situations influence the display of traits (see Epstein, 1980), but psychologists are in general agreement about the meaningfulness of general traits such as the 'Big Five' (Goldberg & Saucier, 1998). Similarly, although research suggests that people have different mean levels of risk in different domains (Blais & Weber, 2006), the question of whether there is enough cross-situational consistency in risk attitudes to treat general risk taking as a meaningful trait is far from settled (Highhouse, Nye, Zhang, & Rada, 2017).

Decision Styles

Decision styles reflect tendencies to approach decisions in similar ways across time and situations (Epstein, Pacini, Denes-Raj, & Heier, 1996; Harren, 1979; Rowe & Mason, 1987; Scott & Bruce, 1995). Researchers have identified various

categories of decision styles (e.g., Allinson & Hayes, 1996; Epstein et al., 1996; Kirton, 1989; Scott & Bruce, 1995), but it remains unclear how they differ from cognitive abilities and personality traits (Kozhevnikov, 2007). Nevertheless, previous research has demonstrated the usefulness of decision styles for predicting person–job fit (Singh & Greenhaus, 2004), method of conflict resolution (Sáez de Heredia, Arocena, & Gárate, 2004), susceptibility to stress (Thunholm, 2008), and job satisfaction (Crossley & Highhouse, 2005).

The most widely used decision style measure is Scott and Bruce's (1995) General Decision-Making Style (GDMS) questionnaire. The five decision-making styles assessed by the GDMS are: rational, intuitive, dependent, avoidant, and spontaneous. Dependent, avoidant, and spontaneous decision styles have been linked to negative outcomes such as negative feelings in the decision-making process and inadequate planning (Baiocco, Laghi, & D'Alessio, 2009; Galotti, Ciner, Altenbaumer, Geerts, Rupp, & Woulfe, 2006). Wood and Highhouse (2014) found the rational, intuitive, and spontaneous styles predicted self-ratings of decision quality over and above the Big Five personality traits. Only the rational style predicted peer-ratings of decision quality.

IMPROVING DECISION MAKING

The chapter thus far has outlined how people make erroneous decisions and ways in which innocuous factors can lead to inconsistent and irrational decisions. More recently, decision-making researchers realized that biases and flaws in human judgment can be corrected or even used to influence people in making better choices in life. Next, we will cover two topics in how decisions in the workplace can be improved. The first is how to reduce biases in judgments and the second is how to shape the environment to influence better decisions.

Debiasing

For much of the chapter, we discussed ways in which the context and cognitive processes bias judgments and choice. Equipped with the understanding of how these systematic biases occur, JDM researchers have begun to explore ways to close the normative and descriptive gap. One strategy is to hold decision makers accountable for

their choices. Holding an individual accountable has a motivational effect on the decision maker by forcing him to be more critical and more considerate. For example, De Cremer & van Dijk (2005) found that when accountability was low, leaders tended to allocate more resources toward themselves rather than his followers. However, when making the decision makers more accountable, one has to be aware of the negative consequences as well. For example, the social nature of accountability may induce socially desirable behaviors (Brown, 1999). Accountability can also strengthen certain biases. For example, Slaughter et al. (2006) found that it amplified the decoy effect in a performance judgment task. Accountability can lead to better decisions when people take the extra time and are using valid cues. However, it can backfire if people are incorporating invalid cues in their judgment and decision process. Tetlock and Boettger (1989) found that, when judges are held accountable, they rely more heavily on irrelevant information in performance judgments, thus leading to more diluted judgments.

A second strategy to reduce bias is to 'consider the opposite'. Asking individuals to consider the opposing choice has been shown to reduce overconfidence, hindsight bias, and anchoring effects (Larrick, 2008; Mussweiler, Strack, & Pfeiffer, 2000). This strategy works because people in general tend to succumb to confirmation bias: which is the bias to seek confirmatory information. Therefore, considering contradictory reasons partially alleviates this bias, which can lead to better calibrated judgments. Finally, if we cannot fix the flaws in human intuition, then the best solution is to rely on statistical linear models (Meehl, 1954). Dawes (1996) provided several instances in which 'expert' judgments made in light of statistical information result in poorer predictions than when the statistical information is used alone. Dawes cautioned that combining statistical and expert judgment only works when the expert judges have access to unique information not included in the statistical model, such as when some external condition prohibits the realization of the predicted outcome (commonly referred to as a 'broken-leg' cue). Nevertheless, even 'broken-leg' cues are not always predictive or diagnostic of future behaviors (Highhouse, 2008).

Choice Architecture

One of the emerging topics in decision making is an area called choice architecture. Choice architecture is at the intersection of psychology, behavioral economics, and policymaking. The founder

of choice architecture, Richard Thaler coined the term ‘nudges’ to describe small things that we can do to shape decisions (Thaler & Sunstein, 2008). A nudge is defined as ‘any aspect of the choice architecture that alters people’s behavior in a predictable way without forbidding any options or significantly changing their economic incentives’. Rather than eliminating individual biases in judgments and decisions, choice architecture embraces these biases and takes advantage of them by modifying the choice environment (or ‘nudging’) to promote better decisions.

Choice architecture has been successful in modifying consumer behaviors, investment decisions, and even credit card payments. Johnson and Goldstein (2003) examined the power of defaults in organ donation frequencies. They found that in countries where the default option for organ donation was to opt-in, there is close to 100% agreement rate for organ donation. On the other hand, in countries where the default option is to opt-out, the organ donation rate is abysmally low. Choice architecture has also been used to promote employees in making better decisions toward their retirement saving, insurance, and investment decisions (Benartzi & Thaler, 2007; Johnson, Hershey, Meszaros, & Kunreuther, 1993; Sunstein and Thaler, 2003). The choice architect’s toolbox has many tools: calling attention to the future outcomes can reduce our tendency to be myopic and discount future rewards; reducing the number of alternatives and making the attributes more comparable can reduce the cognitive load of decisions and improve understanding in decision outcomes (Larrick and Soll, 2008, Soll, Keeney, & Larrick, 2013). One key feature of nudges is that they are simple and inexpensive interventions that can lead to significant changes in behavior if applied to a large group of people. I-O researchers should strongly consider these tools and ways that they can improve workplace decisions.

The Criterion Problem

The ‘criterion problem’ has been with applied psychology for nearly a century (see Austin & Villanova, 1992, for a review). It is only more recently that decision theorists have focused on defining and measuring good decision making for the purpose of performance prediction (Bruine de Bruin, Parker, & Fischhoff, 2007; Weiss, Shanteau, & Harries, 2006; Witteman, Weiss, & Metzmacher, 2012; Yates & Tschirhart, 2006; Yates, Veinott, & Patalano, 2003). Bruine de Bruin et al. (2007) developed the Decision Outcome Inventory (DOI), a self-report measure

of decision-making success. Respondents are asked about a series of negative decision outcomes weighted according to the proportion of people who reported not experiencing them. Another approach to assessing decision quality, developed by Curseu and Schruijer (2012) used a criterion composed of items assessing one’s tendency to engage in common decision errors.

Yates and Tschirhart (2006) noted that lay notions of decision quality are multi-faceted, and that almost any objective indicator will be deficient or contaminated. Milkman, Chugh, and Bazerman (2009) suggested that, in addition to the traditional benchmarks from economic theory, decision quality can be evaluated based upon whether (a) after the fact, the decision maker remains satisfied with his or her decisions, and (b) decisions are considered high-quality by others. Accordingly, Wood and Highhouse (2014) measured decision quality by asking the decision maker, and people close to the decision maker, whether he or she generally makes good decisions.

In most psychological research, constructs are measured using reflective indicators. That is, changes in the latent construct are reflected in (i.e., cause) changes in the indicators (Borsboom, Mellenbergh, & Van Heerden, 2003). In some cases, however, indicators can be viewed as causing, rather than being caused by, the latent construct. This occurs when a number of indicators are combined to form a construct (e.g., socioeconomic status) without any assumptions as to the patterns of intercorrelation between the items. The DOI is clearly a formative measure of decision quality. Scores on the inventory are arrived at by aggregating responses to life outcomes (e.g., got divorced, loan foreclosed), which have low intercorrelations. There have been a number of concerns raised about the use of formative measures (Bagozzi, 2007; Edwards & Bagozzi, 2000; Howell, Breivik, & Wilcox, 2007). For example, the failure to include relevant outcomes can severely alter construct meaning (Tepper & Henle, 2011).

We believe there is a need for more theory-directed measurement of decision quality. Many of the principles summarized by Austin and Villanova (1992) could help guide such research. One of those principles is to choose criterion dimensions based upon how broadly the conceptual criterion is construed. A very broad judgment of quality may only require a unidimensional performance measure, whereas one that specifies outcomes of good decision making would need to identify the broader domains under which different outcomes fall. Failure to articulate the values involved when including some measures of performance as criteria while excluding others exacerbates the criterion problem.

Research Methods

Decision researchers have used a variety of techniques to make inferences about decision making. Techniques have differed by the degree to which the focus is on the content of decisions or the process of decision making. The simplest content approach has been to observe choice behavior in response to manipulations of the decision environment. Observation of preference reversals in response to attribute manipulations has taught us a great deal about how attribute importance is often unreliable, and how preferences are often constructed at the time of choice (Payne et al., 1992). Another approach to studying attribute importance is to model decisions by means of multiple linear regression analyses (Brunswick, 1956). Other approaches such as analysis of variance (Anderson, 1981), nonlinear regression (Goldberg, 1971) have also been used. These ‘policy capturing’ approaches involve having people provide numerical evaluations of a large number of stimuli and fitting an algebraic model to the data. An implicit assumption common to both the preference-reversal and policy-capturing literatures is that people lack insight into the factors that determine their own decisions (cf., Reilly & Doherty, 1992).

Unlike content approaches that focus on the outcomes of decision processes, process-tracing approaches focus on the steps leading to a decision (see Ford, Schmitt, Schechtman, Hults, & Doherty, 1989). The most common process-tracing approaches have been the use of verbal protocols and information boards. The verbal-protocol approach involves having decision makers think aloud as they work on a problem. These protocols are then transcribed and coded according to themes (e.g., Svenson, 1989). The information-board approach requires decision makers to uncover information arranged in an alternative-by-attribute matrix. Search patterns are then recorded and analyzed (e.g., Payne, 1976). More recently, scholars have used computational models and simulations to model choice over time (Busemeyer & Johnson, 2004). The major finding from both process-tracing approaches has been that people use different strategies, depending on the stage of choice and the number of alternatives available. People generally use a non-compensatory approach early in the decision process, but switch to a compensatory approach when a smaller number of finalists survive initial screening (Ford et al., 1989). Computational models demonstrated that decision processes across individuals could also be modeled with a general sequential sampling paradigm (Busemeyer & Townsend, 1993).

Kahneman (1999) has recommended that more researchers take ‘bottom-up’ approaches to

analyzing people’s reactions to information used in making judgments and decisions. Kahneman used the term ‘instant utility’ to refer to the strength of dispositions to continue or to interrupt experiences as they are occurring. Measuring instant utility requires techniques that assess on-line evaluations of information. This could take the form of verbal-protocol ratings, or continuous physical manipulation of a rating device. One example of this is the Daily Reconstruction Method (DRM) (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004). The DRM allows individuals to record their experiences and emotions with as little memory bias as possible. With easier access to the internet and electronic mobile devices, it has become increasingly easy to collect longitudinal and in-the-moment data using methods such as the DRM and Daily Diaries. These methods are particularly useful for examining how attribute evaluations evolve or change over extended periods. This would be particularly valuable for I/O psychologists interested in studying decision processes that unfold over a long period of time such as job search, recruitment, or termination decisions.

CONCLUSION

Even though we have argued throughout that JDM has much to offer to I-O psychology, we also believe that there is a lot of I-O research and knowledge that JDM researchers should know about. Here are some examples:

- In 1952 the United States contracted I-O psychologists to construct a method to assess (1) ability to organize information, (2) balance a large number of considerations, and (3) arrive at decisions. The psychologists created a simulation called the ‘in-basket’ (Frederiksen, Saunders, & Wand, 1957). Considerable research suggests that the in-basket assesses ability to carefully process information and take decisive action. This clearly requires one to balance both intuition (System 1) and analysis (System 2). It also predicts on-the-job decision performance (Meyer, 1970).
- Field research in I-O shows that ‘thin slices’ are very poor predictors of job performance (see Eisenkraft, 2013). Meta-analyses of the unstructured job interview show that it predicts, at best, 4% of the variance in on-the-job performance (Huffcutt & Arthur, 1994). I-O psychologists have, however, developed methods to *structure intuition* that result in considerable validity gains (Levashina, Hartwell, Morgeson, & Campion, 2014).

Table 20.3 Increment in assessment center validity over cognitive and personality tests with two large managerial samples ($n = 4985$).

Rater Consensus	Unit Weighted Ratings	Optimally Weighted Ratings
.00	.09	.12

Source: From Dilchert and Ones (2009).

- I-O has considerable field data to support the assertion that mechanical combination of predictors outperforms intuitive combination of predictors (Kuncel et al., 2013) and that group discussion *dilutes* the predictive efficacy of even simple formulas (Dilchert & Ones, 2009). As shown in Table 20.3, well-intentioned assessors are destroying the validity of high-fidelity simulations.

The cross-fertilization of I-O and JDM provides new perspectives for studying decisions in the workplace and a rich platform in which decision processes can be explored.

Notes

- We are grateful to Bill Balzer, Mike Doherty, Jody Hoffman, Jerel Slaughter, Jeff Stanton, and Klaudia Konik for their helpful comments on earlier drafts of this manuscript. We are also grateful to Lilly Lin for her assistance in copy editing.
- This example was taken from Fox and Ülkümen (2011).
- Whereas this semantic framing effect is similar to the 'Susan' example discussed in the section on risky choice, they are qualitatively different phenomena. The hypothetical Susan was risk averse for two objective gains, and risk seeking for two objective losses (i.e., a reflection effect). Risky-choice framing, however, involves taking the *same* objective outcomes and presenting them in terms of gains or losses (See Fagley & Miller, 1987, for a discussion of the difference between reflection effects and framing effects).

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