
International Handbook of Research on Teachers' Beliefs

Edited by
Helenrose Fives and
Michele Gregoire Gill



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Teachers' beliefs play a fundamental role in the education landscape. Nevertheless, most educational researchers only allude to teacher beliefs as part of a study on other subjects. This book fills a necessary gap by identifying the importance of research on teachers' beliefs and providing a comprehensive overview of the topic. It provides novices and experts alike a single volume with which to understand a complex research landscape. Including a review of the historical foundations of the field, this book identifies current research trends, and summarizes the current knowledge base regarding teachers' specific beliefs about content, instruction, students, and learning. For its innumerable applications within the field, this handbook is a necessity for anyone interested in educational research.

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This book is dedicated to . . .

- Ann Bourke Fives, Rennae Kimbrough, and Patricia A. Alexander, mother, colleague, advisor; the mentors who shaped my development and expanded my beliefs. HF
- Pat Ashton, who advised me, oh so gently, to not seek premature closure to my questions, and whose generous mentoring formed my wild scholar's heart. MGG

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1

INTRODUCTION

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“People’s level of motivation, affective states, and actions are based more on what they believe than on what is objectively true.”

(Bandura, 1997, p. 2)

Beliefs can be conceptualized as an “individual’s judgment of the truth or falsity of a proposition” (Pajares, 1992, p. 316) or “as a set of interrelated notions” (McAlpine, Eriks-Brophy, & Crago, 1996, p. 392), or “as a set of conceptual representations which store general knowledge of objects, people and events, and their characteristic relationships” (Hermans, van Braak, & Van Keer, 2008, p. 128). As noted by Fives and Buehl (2012), defining beliefs is not always the challenge in this field (although it is a challenge), but finding consistency across these definitions so that one can come to a meaningful, pragmatic, and warranted conceptualization of the research seems to be a more epic quest for scholars in this field: a quest the authors of the *International Handbook of Research on Teachers’ Beliefs* have undertaken with zeal.

As Bandura (1997) argued, *beliefs* more than *truth* guide our goals, emotions, decisions, actions, and reactions. In classrooms, teachers, those responsible for the organization, structure, and tone of learning experiences and social development, rely on their implicit and explicit beliefs to function in the complex context of classrooms, embedded in schools, embedded in communities, embedded in larger national, international, diverse cultures. In the moment-to-moment existence of practice, teachers frequently rely on beliefs, particularly those that underlie their intuition, automaticity, and habit, to meet the demands of practice. Teachers’ beliefs can facilitate or hinder practice by serving to filter, frame, and guide experience, decisions, and actions (Fives & Buehl, in press). The importance of teachers’ beliefs is evidenced by decades of research and continued exploration of this construct theoretically and practically.

Educational researchers have addressed teachers' beliefs in their work for more than half a century. In some cases teachers' beliefs were the direct focus of inquiry, and, more frequently, they served as an additional variable or contextual component included in explanations of theory and evidence gathered. This growing body of research spans multiple disciplines, theoretical paradigms, and methodological approaches. Several substantive reviews of this literature exist (e.g., Calderhead, 1996; Fives & Buehl, 2012; Kagan, 1992; Pajares, 1992; Thompson, 1992); however, each of these important works reflect a specific framework of the researchers involved (e.g., quantitative studies of mathematics teachers' beliefs), and little work has been done to draw across interrelated fields of study to examine the full corpus of perspectives on teachers' beliefs. This handbook provides such an effort and frames the similarities and distinctions across the varied approaches to teachers' beliefs. Specifically, the goal of this project was to provide novices and experts in the field with a single volume that discloses the complex landscape of the research and theory on teachers' beliefs. Chapters in the *Handbook* review the historical foundations of the field, identify current trends in the research, and span the varied work that investigates teachers' specific beliefs about content, instruction, students, and learning.

OVERVIEW OF SECTIONS AND CHAPTERS

The *Handbook* is organized into six sections that house different approaches to questions and studies of teachers' beliefs. Our organization is one approach, and a blunt one at that, to map the field and name the areas of investigation. The sections of this book reflect both common groupings of investigations of teachers' beliefs as well as an organizational scheme that might be seen in other areas of research. Thus, we sought to present the research in the most commonly recognized way. Sections I ("Foundations of Teachers' Beliefs Research") and II ("Studying Teachers' Beliefs") provide a theoretical, historical, and methodological framing of the field and orient the reader to the scope of the work, key findings, common conundrums, and varied approaches to investigating teachers' beliefs. Section III, "Teachers' Identity, Motivation, and Affect," frames current understandings of the intersection of teachers' beliefs within their self-systems as an aspect of motivation for practice, professional identity, and emotional or affective responses. Sections IV–VI summarize the "beliefs about" research. Pajares (1992) noted that teachers (or anyone) do not just have a "teacher belief"; rather, they have beliefs *about* specific topics or constructs, and in particular contexts these specific beliefs seem to matter in varied ways. Much research has been conducted within key topic areas that are reflected in these sections of the *Handbook*, namely teachers' beliefs about pedagogy and school context (Section IV), knowing and teaching in academic domains (Section V), and learners (Section VI). Following the section overviews, we highlight some considerations for theory, research, and practice that span the topical organization of the *Handbook*. We invite the readers to consider these issues as they read across chapters.

Foundations of Teachers' Beliefs Research

We begin in Section I of the *Handbook* by addressing the foundations of research on teachers' beliefs with chapters on the nature of these beliefs, historical and theoretical perspectives on the field, how beliefs develop, and the relation of beliefs to

practice. Skott (Chapter 2) provides an overview of the current state of research in the field by addressing the promises of beliefs research as well as the conceptual and methodological problems that have plagued this area of research, setting the stage for the more detailed discussions of these issues that occur in ensuing chapters. He then focuses on addressing the divide between teachers' beliefs and their practice, arguing that a participatory framework has potential for advancing research and theory on teachers' beliefs. In Chapter 3, Ashton provides a thorough historical overview of the evolution of research on teachers' beliefs, identifying how theoretical perspectives have changed over time. Her chapter should serve as a foundational introduction for both those well-versed in beliefs research as well as newcomers to the field. Levin (Chapter 4) builds on these two foundational chapters by delving into the under-researched issue of how beliefs develop, focusing on the source, context, and stability of teachers' beliefs. She then uses research on Personal Practical Theories as a model to explain how tacit beliefs develop into explicit beliefs for preservice, novice, and experienced teachers. Section I concludes with an ambitious chapter by Buehl and Beck (Chapter 5) in which they tackle the thorny issue of the relation between teachers' beliefs and practices. In their chapter, they provide a helpful overview of the all the possible ways teachers' beliefs may be related to their practices, supported by a strong review of research. They then discuss the internal and external factors that influence the enactment of beliefs and promote key theoretical frameworks for examining research on beliefs. We agree that these frameworks are helpful and will serve to advance future research and theory on teachers' beliefs. As a whole, these chapters provide a comprehensive overview of both the past and current state of the field as well substantive directions for future research.

Studying Teachers' Beliefs

Section II of the *Handbook*, titled "Studying Teachers' Beliefs," provides in-depth examinations of the methodological issues in studying teachers' beliefs. In their organizational review of how teachers' beliefs are assessed, Schraw and Olafson (Chapter 6) provide keen insight into the conceptual and measurement challenges faced by researchers interested in teachers' beliefs. They identify 10 strategies for accessing teachers' beliefs and in doing so provide a solid introduction for chapters 7 and 9. In Chapter 7, Hoffman and Seidel present a comprehensive review of the tools and methods used to assess teachers' relatively stable beliefs that have been related to effective teaching and learning. In doing so they identify five areas of belief "topics" (e.g. beliefs about self, knowledge, teaching, etc.) and review 33 different measurement tools and approaches that can be used to tap into teachers' beliefs. Olafson, Salinas, and Owens (Chapter 8) review common qualitative approaches to research on teachers' beliefs and highlight the power of qualitative approaches for researchers who seek to understand teachers' beliefs embedded in the lived experiences and contexts of learners. Finally, in Chapter 9, Bullough provides a unique exploration into alternative methods for accessing teachers' beliefs: teacher writing, scenarios, and metaphors. In doing so, he offers a rich historical contextualization of these methods and describes the strengths and concerns associated with using each. Taken together, the chapters in Section II provide a structured introduction to research methodologies in this field, an objective critique of common approaches, and sound recommendations for research.

Teachers' Identity, Motivation, and Affect

The third section of the *Handbook* focuses on teachers' identity, motivation, and affect. Chapters in this section focus on identity and self-beliefs (e.g., self-concept, possible selves), teachers' motivation, teachers' sense of efficacy, and the connection between beliefs and affect. Zembylas and Chubbuck (Chapter 10) provide a groundbreaking analysis of the intersection between teachers' beliefs and their identity from a political framework. In doing so, they address the issue of teacher identity and how it is both distinct from, yet informed by teachers' beliefs. Further, they foreground the political context surrounding teachers' identity, thereby addressing the issue of contextual influences on the formation of teachers' beliefs. In Chapter 11, Watt and Richardson extend three leading theories of motivation (expectancy-value theory, achievement goal theory, and self-determination theory), usually applied to student learning, to address teachers' motivation and beliefs, thereby broadening these theories' scope to provide a more comprehensive overview of the teaching and learning process. Siwatu and Chesnut (Chapter 12) provide an interesting perspective on teachers' self-efficacy research by focusing on the role of self-efficacy beliefs in the career development of teachers. In particular, they address the pressing question of how to obtain and retain high-quality teachers, and they offer a list of 10 practical suggestions for helping teachers to develop resilient efficacy beliefs. Gill and Hardin (Chapter 13) conclude this section by focusing specifically on the relation between teachers' beliefs and affect, highlighting the iterative relationship between teachers' beliefs and emotions and providing definitions and clarifications of affective constructs related to beliefs, based on a review of social psychological and cognitive psychological research. In addition, they review research related to teachers' beliefs about emotion and research on hot models of conceptual change, proposing a theoretical framework for studying beliefs in a more realistic context using hot models of cognition. The chapters in this section make an important contribution to research and theory on teachers' beliefs by addressing the contextual, motivational, and affective factors related to teachers' beliefs. In doing so, the authors provide a more nuanced portrayal of how teachers' beliefs are intricately tied to the educational process.

Contexts and Teachers' Beliefs

The chapters in Section IV focus on teachers' domain general beliefs about teaching, assessment, instruction, and the school context as well as how the context interacts with those beliefs. This section opens with a chapter by Fives, Lacatena, and Gerard (Chapter 14) in which investigations of teachers' domain-general beliefs about teaching and learning are reviewed. A salient finding in this work is that very few studies address teachers' beliefs about *learning*. Further, the research on teachers' beliefs about teaching seems to conflate issues of epistemology, instructional practices, and learning such that when the common dichotomous comparison of teaching (e.g., traditional versus constructivist teaching) is adopted, the findings are difficult to interpret due to conflated and underspecified descriptions of what is meant by each perspective. A similar issue of ill-defined constructs is reported by Rubie-Davies, in her chapter on teachers' beliefs about the school climate (Chapter 15). In

this chapter, Rubie-Davies describes the ways that teachers' beliefs influence their instructional decisions and subsequently influence the class climate. Specifically, she identifies four sets of beliefs that teachers hold (i.e., self-efficacy, mastery goals, differentiation, and expectations) as critical to the development of the instructional and socioemotional climate in classrooms. Barnes, Fives, and Dacey (Chapter 16) review the literature on teachers' beliefs about assessment by (a) describing the research on teachers' beliefs about the purposes of assessment that range from a learning perspective (assessment is to facilitate learning) to an accounting/accountability perspective (assessment is to hold learners, teachers, and schools accountable), (b) comparing teachers' beliefs about assessment purposes across high- and low-stakes international contexts, and (c) examining the alignment between beliefs about assessment and teaching practices. The final chapter in this section by Tschannen-Moran, Salloum, and Goddard (Chapter 17) provides an analysis of the influence of teachers' collective beliefs in shaping the school context, which in turn influences instructional activities in schools. Tschannen-Moran and colleagues underscore the contextual nature of beliefs and remind readers that teachers' beliefs are not developed in a vacuum; rather, they are constructed through interactions with others in their school, and as such they both shape and are shaped by teachers' personal beliefs and experiences. Further, they highlight the important role of school administrators in creating the school climate. The chapters in this section highlight the intersection of context and beliefs. Further, they illuminate the conceptualization of beliefs as part of and shaping the context itself. Fives et al. (Chapter 14) and Rubie-Davies (Chapter 15) focus on teachers' classroom level beliefs about teaching and learning. Barnes et al. (Chapter 16) and Tschannen-Moran et al. (Chapter 17) offer broader perspectives on the relations of school and community contexts on teachers' beliefs and the development of those beliefs in varied settings.

Teachers' Beliefs about Knowing and Teaching within Academic Domains

In Section V, we turn to a consideration of domain-specific beliefs, particularly in academic subject areas, and epistemic beliefs about knowing and knowledge, with a focus on personal epistemology, mathematics, reading, science, social studies, and technology. We begin with a comprehensive overview of research on teachers' epistemic beliefs by Lunn, Walker, and Mascadri (Chapter 18) in which the authors examine the relationship between teachers' personal epistemologies and their teaching practice, how personal epistemologies develop over time, and how they influence children's personal epistemologies. Next, Cross Francis, Rapacki, and Eker (Chapter 19) provide a critical review of research on teachers' beliefs related to mathematics. Their work draws on both cognitive and sociocultural perspectives to review the current state of research on teachers' beliefs about mathematics and their influence on instructional decision making. Cross Francis and her colleagues provide an important contribution to the field with their review of the consequences of misaligned beliefs as well as other beliefs that may interact with teachers' math beliefs to influence teachers' decision making. Next, we turn to beliefs about reading and text in Chapter 20. In their chapter, Maggioni, Fox, and Alexander offer a critical reflection and review of research on teachers' beliefs about reading, what it means to develop as a reader, and what pedagogical practices best support such

development. Additionally, the authors address implications for both classroom practice and teacher education programs. Chen, Morris, and Mansour (Chapter 21) tackle the research on science teachers' beliefs by focusing specifically on teachers' self-efficacy and epistemic beliefs about science, examining the antecedents of such beliefs as well as how these beliefs influence instruction. Further, they present a new theoretical model depicting the relation between epistemic beliefs, goal orientations, self-efficacy, and teaching practice in science including recommendations relevant to teacher education and professional development. Peck and Herriot (Chapter 22) review the variety of beliefs teachers hold about the discipline of social studies and its purpose in the school curriculum, and how these beliefs influence the field of social studies education. This section concludes with Ertmer, Ottenbreit-Leftwich, and Tondeur's review of research on how teachers' beliefs are related to the use of 21st-century technology in the classroom (Chapter 23). Ertmer and her colleagues review the history of research on teachers' beliefs and technology use, as well as address the beliefs-practice divide. Each of the chapters in this section provides an overview of the latest research and theory on particular content-specific beliefs as well as clear recommendations for improving teaching practice.

Teachers' Beliefs about Learners

The final section of the book addresses teachers' beliefs about learners. Included in this section are chapters on teachers' beliefs about developmentally appropriate practice (Wilcox-Herzog, Ward, Wong, & McLaren, Chapter 24), cultural diversity (Gay, Chapter 25), English language learners (ELLs; Lucas, Villegas, & Martin, Chapter 26), and students with special needs and inclusions (Kiely, Brownell, Lauterbach, & Benedict, Chapter 27). Wilcox-Herzog and colleagues (Chapter 24) provide an in-depth look at teachers' beliefs through the lens of developmentally appropriate practices and articulate the relation of these particular beliefs about learners and practice to actual instructional interactions. Issues of diversity and the complexity of teachers' beliefs about cultural diversity are problematized and outlined by Gay (Chapter 25). In this chapter, research on key beliefs about cultural diversity is identified and critiqued. The salience of these beliefs for teaching and learning is discussed and implications for practice are offered. Lucas et al. (Chapter 26) delve into the new and expanding literature on teachers' beliefs about ELLs. The beliefs teachers' hold about ELLs' ability to learn and engage with curriculum filter the judgments and decisions teachers' make with respect to these students. Lucas et al. argue that the growing number of ELLs in the U.S. evidences the need to understand both how these students learn and how teachers' respond to these learners, a response that is shaped by beliefs. The final chapter in the *Handbook* details teachers' beliefs about inclusion, instruction, students with special needs, and teachers' self-efficacy for teaching students with special needs (Kiely et al., Chapter 27). The broad range of topics in this chapter leads these authors to conclude that research on teachers' beliefs in this area deserves serious and systematic study. Together the chapters in this section provide an initial frame for examining teachers' beliefs about learners.

CONSIDERATIONS FOR THEORY, RESEARCH, AND PRACTICE

The research on teachers' beliefs reviewed in this book is organized by topic. Sections I and II provide foundational and methodological perspectives on teachers' beliefs, while the remaining sections follow the outline of belief topics, that is, topics that teachers hold beliefs *about*, offered by Fives and Buehl (2012). A review of the chapters in this book underscores the relevance of teachers' beliefs in understanding, predicting, and shaping the landscape of education in local and global contexts. Our review of the chapters in this book and discussions with chapter authors has allowed us to identify recurring issues in chapters presented that should be considered carefully by the field at large as well as by individual belief researchers.

Considerations for Theory

Research in teachers' beliefs needs to develop theoretical frameworks that specify the influence and interaction of teachers' beliefs within self-systems and sociological contexts. Some of the fragmentation in the research on teachers' beliefs evidenced across these chapters comes from the varied topics of beliefs studied (e.g., beliefs about teaching, assessment, mathematics, science, diversity, learners, etc.) that have led to topic-centered research within larger fields of study (e.g., math education or motivation) that seem to rarely intersect across topics for either theoretical or methodological development. Until researchers of teachers' beliefs begin reading outside of their topic interests and expanding the theoretical conceptualization of teachers' beliefs within and across topics, as a field we continue to risk repetition within topics rather than forward development of the field of research on teachers' beliefs.

Teachers' beliefs are part of a complex multidimensional system with potential clusters of contrasting beliefs that are or are not enacted in given moments of practice due to a variety of factors that are situated within the teacher and social context. Theory needs to address the multidimensional nature of beliefs and provide insights into factors in the individual or context that lead some beliefs to be evoked in particular instances. Such a theoretical lens might suggest moving away from a topic focused study of teachers' beliefs to examining beliefs as evoked in practice by context.

Related to this is the need for a theoretically guided identification of viable outcome variables with respect to teachers' beliefs. Much of the research reviewed in this book reveals mixed results with respect to the influence of beliefs on practice and/or student achievement (e.g., Buehl & Beck, Chapter 5). However, the few theoretical models of beliefs identified rarely indicate that teachers' beliefs should directly influence either of these outcomes (e.g., Rubie-Davies, Chapter 15; Siwatu & Chesnut, Chapter 12), yet it seems to be the continued goal of the researchers to provide a direct link from beliefs to practice and student achievement. We need complex, context sensitive, well-supported theories of teachers' beliefs that specify the functions beliefs may serve and the factors that they may reasonably influence. Gay (Chapter 25), for example, highlights influences of beliefs on outcomes other than achievement, including things such as classroom norms, teacher-student relations,

and affective climate. These factors may or may not influence student achievement, but they do influence the overall learning experience for children and could be considered as viable outcome variables for researchers interested in understanding the entirety of educational experiences.

Finally, there is a tendency across the implications sections of studies of teachers' beliefs to recommend changing beliefs with little evidence that such changes will actually lead to better outcomes, especially when those outcomes are underspecified. Fives and colleagues (Chapter 14) highlight this concern in the final section of their chapter. They draw on the recommendation from Muis (2004) that beliefs need to be evaluated in context and from that perspective be considered as more or less availing, rather than assuming the value of the belief independent of practice, practitioner, and context.

Considerations for Research Design

The chapters in Section II of the *Handbook* detail the current state of research design and raise several methodological issues for consideration. Here we highlight two design issues that seemed to be both pervasive and under recognized. These concerns relate to (a) the nature of research participant pools, and (b) the conflation of teacher education pedagogy with research design. As noted by Levin (Chapter 4) and Gay (Chapter 25), there seem to be several common biases in the selection of participants for studies of teachers' beliefs. These biases may be due more to a reliance on convenience samples than anything else, but the bias remains. Thus, across the studies reviewed in this book, we can note that most of the research participants were white, middle-class women, located near research institutions, if not enrolled in courses in teacher education. These samples provide data that shapes our understanding of teachers' beliefs. Researchers need to consider how these convenience samples may influence findings and begin to develop systematic approaches to sampling that can reduce some of these biases.

Related to the issue of sampling is the pervasive use of teacher education or professional development coursework as contexts for research in teachers' beliefs. In most cases authors are pulling double duty as both teacher educator and researcher. When this happens, the individual as researcher and teacher educator may end up in conflict and face competing goals, where the priorities of one role may need to supersede the priorities of another. This issue is salient in the methods reviewed by Bullough (Chapter 9) where teacher writing, often assigned as coursework, is also used as research data. When coursework is used as data one must always question the veracity of these self-reports as they are responses to prompts intended to assign grades. There is an inherent tension in blending research and teaching that requires systematic attention. This tension is twofold: on one hand, researchers may examine data on a post hoc atheoretical basis determined by what was gathered as course instructors. On the other hand, course instructors may gather data to meet their research needs without considering the educational experiences of their students. It seems to us that researchers engaging in this kind of work need to take particular care in examining the ethics, rigor, and meaningfulness of their work in light of these tensions.

Considerations for Practice

The research reviewed in this book provides recommendations for theory, research, and practice. In the realm of practice most implications are directed toward teacher educators in university or school settings who work with preservice and practicing teachers. Specific recommendations vary across the chapters, but there are ongoing issues that need to be considered when making recommendations for practice. First, delving into one's own beliefs is hard emotional work; supporting others in this journey is equally as challenging. The issue at hand is whether teacher educators are prepared to provide that support. Second, as noted by Gay (Chapter 25) with respect to beliefs about cultural diversity, many recommendations for practice are reactive rather than proactive responses to teachers' beliefs. We would argue that this concern is present across belief topics. A recommendation to change beliefs is reactive, according to Gay (Chapter 25). In contrast, a proactive response would begin with studying successful instructional practices and through this investigation help current and future teachers construct beliefs that support those practices. Another theme that is prevalent throughout the *Handbook* is how teachers' beliefs are significantly shaped by school culture and context, from teachers' efficacy beliefs (Siwatu and Chesnut, Chapter 12) to teachers' identity (Zembylas and Chubbuck, Chapter 10) to collective beliefs and norms (Tschannen-Moran et al., Chapter 17) to subject-specific beliefs such as mathematics (Cross Francis et al., Chapter 19) to name a few, though this theme is woven throughout many of the chapters in the *Handbook*. The role of school administrators (Chapter 17) in influencing this context is an important one, even if the political context may be inhospitable to particular beliefs about learning (Chapter 10).

CONCLUSION

This book provides multiple perspectives on the field of research on teachers' beliefs from renowned international scholars. As the field of teachers' beliefs comprises all other fields within education, this book provides a unified presentation of the current knowledge base in the field. It spans theoretical, historical, and domain-specific perspectives to provide readers with a large-scale scope of the field that is detailed enough to provide rich information as to the state of research in each area. The topical coverage ranges from theoretical perspectives to methodological approaches to beliefs about the self, others, and how to teach. The breadth of chapters provided will make the *Handbook* an indispensable resource for guiding future research in this area. Essential to research in education are the practical applications that can be used in teacher preparation programs and K-12 classroom environments. Authors of the *Handbook* chapters provide explicit research-based examples of how to use this work in daily practice.

It is because we see beliefs as fundamental to understanding who teachers are and what they do that we chose to embark on this creating the *Handbook*. We hope this endeavor helps the field of teachers' beliefs research advance in theoretically compelling and sound methodological ways to help shape our understanding of the complex nature of learning and teaching in today's classrooms.

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Section I

Foundations of Teachers' Beliefs Research

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THE PROMISES, PROBLEMS, AND PROSPECTS OF RESEARCH ON TEACHERS' BELIEFS

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The field of teachers' beliefs is interested in teachers' thinking about meta-issues such as what knowledge is in a certain domain, how students become proficient in that domain, and what teachers may do to facilitate the development of such proficiency. Also, it is concerned with how these lines of thinking develop and with their role for classroom practice.

It is beyond the scope of a single chapter to review a field as big as the one of teachers' beliefs, and if seen as a review, there are obvious limitations to the present chapter. One is that I have limited the number of different lines of research included. I draw on the general research on teachers' beliefs for instance in educational psychology as well as on two domain specific fields, mathematics and science education, that both have strong traditions for research on teachers' beliefs (for mathematics see Cross Francis, Rapacki & Eker, Chapter 19 this volume; and science see Chen, Morris, & Mansour, Chapter 21 this volume). I do not, however, refer to other significant scholarship, such as mother tongue, history, or ESL education (readers can see Peck & Herriot Chapter 22 and Lucas, Villegas, & Martin Chapter 26 in this volume for research on the latter two). Second, I do not deal specifically with different types of teachers' beliefs. It is, then, beyond the scope of the chapter to discuss in detail teachers' generic or domain specific personal epistemologies, their beliefs about teaching and learning, and their views of themselves as teachers, doers, and learners of particular domains, as well as what the relative significance is of these different beliefs.

For my present purposes I have chosen to view the field from a fairly high vantage point. Building on literature from the early 1980s onwards, I discuss the general rationale of the field, the challenges it faces, and a suggestion for how recent developments may be taken as indicators for possible ways ahead. The main point is that the experiences from the last three decades invite us to reconsider the role of dominant theoretical frameworks in the field, including the conceptualization of the key

construct of beliefs, and the main methods of inquiry. The argument is based on a reasonably comprehensive reading of the scholarship on teachers' beliefs. But I do not claim to do justice to the field in its entirety.

THE PROMISES OF RESEARCH ON TEACHERS' BELIEFS

Prior to the 1980s, suggestions for educational reform generally consisted of carefully structured sequences of contents to be taught, sometimes informed by clinical studies of student learning. However, they largely ignored the role of the teacher for the students' opportunities to learn (Bauersfeld, 1979; Lederman, 1992). As Elbaz (1981, 1983) pointed out the prevailing approaches to curriculum did not acknowledge the "complex type of action and decision making" through which the teacher positions herself in the curriculum development process (1981, p. 44).

Over the following decades growing numbers of classroom observations and semi-structured interviews were conducted in order to study the acts of teaching, including teachers' thinking as it relates to the profession (Clark & Peterson, 1986). This was based at least in part on an acknowledged need to move beyond process-product studies that had linked teacher behavior to student performance (Brophy & Good, 1986; Fenstermacher, 1978).

In some cases (cf. the quotation from Elbaz above), the new approach meant seeking to understand learning and lives as they unfold in schools and classrooms as seen from the perspective of the teachers themselves. Beliefs became a key concern, as in order "*to understand teaching from teachers' perspectives we have to understand the beliefs with which they define their work*" (Nespor, 1987, p. 323, emphasis in original). Sometimes the purpose of understanding was coupled with the ambition of remedying the situation that "the practical wisdom of competent teachers remains a largely untapped source of insights for the improvement of teaching" (Feinman-Nemser & Floden, 1986, p. 505).

In other cases, and in contrast to the approach above, research on teachers' beliefs acknowledged the significance of the teacher's thinking but viewed her primarily as an obstacle to change (Thompson, 1984). In this line of research, teachers were considered a major problem of implementation. This is evident for instance in a study by the International Commission on Mathematics Instruction (ICMI) from the mid-1980s on the future challenges for school mathematics. The study acknowledged the experiences from the new-math era "that what is desirable might not be attainable; and that goals must be set which acknowledge the existence of constraints" (ICMI, 1986, the text on the back of the book). Although the section on teachers indicated that teachers' suggestions may be useful for educational development, the section on processes of change stated that most teachers

have firm ideas about their role in the school and clear expectations regarding both the curriculum and their students. Significant changes in school mathematics will only be achieved if there are marked changes in the perceptions and attitudes of these teachers and if they are assisted to develop necessary new skills.

How can one attempt to change attitudes, values, skills, teaching styles, etc. and develop confidence in the use of new methods and technology?

The increased emphasis on the teacher's thinking was, then, aimed either at understanding classroom processes from the teachers' perspective, solving the problems of implementation, or striking some balance between the two. In all cases it was further fueled by changes in the structural features of classroom practice, such as less limiting timetables, the availability of a multitude of curricular materials, and the move towards more child-centered approaches (Eggleston, 1979). Also, it coincided with a set of reform initiatives that required the teacher to move to center stage of curriculum enactment. These initiatives were informed by changes in the views of learning and of the contents to be taught.

The Teachers' Move to the Center Stage of Curriculum Enactment

The early 1980s marked the beginning of the constructivist revolution, and learning became reconceptualized as assimilation of new experiences to existing cognitive schemes and accommodation of existing schemes to such experiences (Cobb & Steffe, 1983; Nussbaum & Novick, 1982; von Glasersfeld, 1995, 2007). The focus on individual meaning-making shifted the emphasis from teaching—in a traditional expository sense of the term—to learning, in the form of individual students' adaptations to new experiential realities. Although it is generally problematic to draw instructional implications from epistemology (Cobb, 1988; Hewson, Beeth, & Thorley, 1998; Prawat, 1992), there are ways of teaching that are at odds with constructivist tenets. Especially, teachers are expected not merely to present sets of ready-made concepts and procedures for the students to copy and follow, but to engage them in content-related processes that may challenge their pre-understandings and link the contents to their everyday experiences in meaningful ways.

This dual emphasis on processes and products to facilitate student learning was supported by shifts in the understandings of the contents itself, not least in science and mathematics. The image of science as an accumulation of piecemeal discoveries of scientific truths was challenged by the history and philosophy of the field, which pointed to the theory-laden, creative, and tentative character of scientific claims (e.g. Kuhn, 1962). In mathematics a similar concern for historical developments was reflected in an interest in mathematical problem solving and in growing numbers of references to for instance Lakatos (1976). He suggested that mathematics develops through continued processes of proofs and refutations, rather than as the steady growth of indubitable truths. If this is the case and if 'school mathematics' is not to be a misnomer, so the educational argument goes, students need to become engaged in similar mathematical processes. Consequently the new vision for school mathematics included that students engage in complex tasks and become involved in and reflect on disciplinary processes of, for instance, investigating, conjecturing, reasoning, and explaining (National Council of Teachers of Mathematics, 2000). These processes serve two purposes. They constitute educational goals in their own right, as students are expected to understand and become proficient in domain-specific methods of inquiry, and they are seen as instructional strategies that provide the students with opportunities to learn the traditional contents with understanding and in connection with their out-of-school experiences.

Although the reform implies a shift of emphasis towards student learning, it simultaneously increases the significance of the teacher, as it involves an element of planned unpredictability in classroom interaction (Skott, 2004). The teacher needs continuously to assess the students' experiences and pre-understandings, to interpret the academic and cognitive potential of their suggestions and conjectures, and to adjust her support to individuals and groups of students accordingly (Prawat, 1992). To be able to do so, she needs proficiency and confidence in handling the disciplinary processes; command over the concepts and procedures that are the envisaged outcomes of such processes; and understanding of how the processes and the outcomes are related. However, it seems equally important that the teacher shares the view of the content and its teaching and learning promoted by reform initiatives (National Research Council, 1996).

The research interest in teachers' beliefs, then, is to a large extent based on the somewhat rhetorical question of how one can expect teaching-learning processes in schools to unfold in line with a reform, if its priorities are not shared by the teacher? Phrased in more positive terms, research and development work in the field of beliefs promised to solve or at least alleviate the problems of implementation as they relate to a set of reform initiatives that position the teacher centrally in the teaching-learning process.

Beliefs as an Explanatory Principle for Practice

As Clark and Peterson (1986) pointed out, process-product studies of teacher efficiency were based on the expectation of a unidirectional causality between teacher behavior and student learning. Large parts of the early research on teachers' beliefs were based on a similar expectation but shifted the research interest from observable behavior to purposeful action and from the outcomes of instructional activity to the expected causes in terms of teachers' beliefs. Teachers' beliefs, then, were generally considered a main determinant of instructional activity and of student learning. Schoenfeld (1992), for instance, emphasized mathematics teachers' beliefs about the subject itself and claimed that "the teacher's sense of the mathematical enterprise determines the nature of the classroom environment that the teacher creates. That environment, in turn, shapes students' beliefs about the nature of mathematics" (p. 359).

Schoenfeld claimed a direct causality between teachers' subject-specific personal epistemology and classroom practice. Other research on teacher's beliefs was, and to some extent still is, premised on and fueled by a similar, but less deterministic expectation that beliefs significantly shape classroom processes (Fives & Buehl, 2012; Lederman, 1992; Wilson & Cooney, 2002). Rokeach (1969), suggested that beliefs constitute a "disposition to act" (p. 113); Clark and Peterson (1986) that teacher behavior is "guided by and make[s] sense in relation to a personally held system of beliefs, values, and principles" (p. 287); Grossman, Wilson, and Shulman (1989) that teachers beliefs "powerfully affect their teaching" (p. 31); Pajares (1993) that "beliefs are the best predictors of individual behavior" (p. 45); and Borko and Putnam (1996) that "teachers' knowledge and beliefs—about teaching, about subject matter, about learners—are major determinants of what they do in classrooms" (p. 675). Teachers' beliefs, then, are generally regarded as an explanatory principle for practice (Skott, 2009a).

The role attributed to teachers' beliefs is of particular interest in relation to the implementation of curriculum reform. In his challenge to the process-product approach to teacher effectiveness, Fenstermacher (1978) suggested that if "our purpose and intent are to change the practices of those who teach, it is necessary to come to grips with the subjectively reasonable beliefs of teachers" (p. 174). More specifically, teachers' beliefs are viewed as a filter, interpretive device, and transformer of curricular intentions developed elsewhere (Bryan, 2012; Grossman et al., 1989; Kagan, 1990; Nespor, 1987; Pajares, 1992). Remarks to the same effect were made in relation to the specific reform initiatives outlined in the previous section (Beyer & Davis, 2008; Kagan, 1992; Liljedahl, 2011; Lloyd, 2005; Prawat, 1992). Focusing on teachers of science and phrasing the relationship in somewhat negative terms, Bryan (2012) claimed that "the implementation of reform initiatives is compromised," when teachers' beliefs are not in line with the philosophical underpinnings of the reform (p. 483–484).

In general, then, research on teachers' beliefs promises to solve or at least alleviate the problems of implementation. The field, however, does not seem to have fulfilled the promises of its founders and followers. Attempts abound in teacher education and development programs to change the participants' beliefs so as to be in line with current reform initiatives. However, prospective and practicing teachers' existing beliefs seem to be resistant to change (Richardson, 2003), and even when espoused beliefs do resemble reform efforts, classroom practices may not comply or may focus on surface features only (Spillane, Reiser, & Reimer, 2002). For instance, the use of group-work or hands-on materials may be taken as indicators of reform teaching by the teacher, even though the character of the discussions and investigations bear little resemblance with those envisaged by the reform.

In spite of these difficulties, the field of teachers' beliefs is still expected to significantly support curriculum reform. One may wonder, however, if these expectations are overly optimistic and need to be revised. (Skott, 2009a; 2009b). I return briefly to this question later. Before doing so, I discuss some of the challenges involved in researching teachers' beliefs.

THE PROBLEMS OF RESEARCH ON TEACHERS' BELIEFS

So far I have used the notion of beliefs as an unproblematic concept. However, it is apparent from the literature that it is not easily defined, and at present there is no consensus about an explicit definition. Further there are significant methodological problems in accessing these elusive constructs. I discuss these two sets of problems in turn.

Conceptual Issues

Writing about beliefs in general and before research on teachers' beliefs gained momentum, Rokeach (1969) saw beliefs as part of a functionally integrated cognitive system that also includes attitudes and values. He defined beliefs as "any simple proposition . . . inferred from what a person says or does, capable of being preceded by the phrase 'I believe that . . .'" (p. 113). Distinguishing beliefs from attitudes and values, he defined an attitude as "a relatively enduring organization of beliefs around an object or situation, predisposing one to respond in some preferential manner"

(p. 112), and a value as “a single belief that . . . guides actions and judgments across specific objects and situations, and beyond immediate goals to more ultimate end-states of existence” (p. 160). Others, sometimes working specifically with teachers’ beliefs, also engage in lengthy discussions about the concept and try to disentangle it from related notions such as knowledge, conceptions, values, goals, and emotions (Abelson, 1979; Nespor, 1987; Pajares, 1992; Philipp, 2007; Törner, Rolka, Rösken, & Sriraman, 2010). In spite of the efforts, however, no agreement has been reached about a definition. Possibly as a consequence, others only define beliefs implicitly and in use, indicating that in spite of the lack of an agreed-upon definition there is sufficient consensus about a core of the concept for continued research to make sense (e.g., Leder & Forgasz, 2002; Wilson & Cooney, 2002). There seem to be four key aspects to such a core.

First, beliefs are generally used to describe individual mental constructs, which are subjectively true for the person in question (Pajares, 1992; Richardson, 1996, 2003; Schoenfeld, 1998). This relates to the last of the three definitions of knowledge discussed in Plato’s dialogue on Theaetetus, namely that knowledge is justified, true belief (Plato, 2009). According to this definition, knowledge is seen as a subset of beliefs in a broad sense. The complement to knowledge, beliefs in the more narrow sense generally discussed in the beliefs literature, is characterized not as unjustified or false, but as not being subject to standard canons of justification and not necessarily being consensual. What to some is a warrant or a plausible reason for a belief, then, may not convince others and not “function as vectors that move beliefs in their direction” (Abelson, 1986, p. 223). It follows that beliefs differ from values that have no associated truth value and from knowledge that carries connotations of objective truth, either in an absolute or a more social sense of the term. Subjective truth means that beliefs are characterized by a considerable degree of conviction, but also that the individual may accept a different position as reasonable and intelligent. Philipp (2007) suggests that this latter characteristic distinguishes beliefs from knowledge.

Second, there are cognitive as well as affective aspects to beliefs, or at least beliefs and affective issues are viewed as inextricably linked, even if considered distinct (Abelson, 1979; Gill & Hardin, Chapter 13, this volume; Nespor, 1987; Pajares, 1992). McLeod (1992) discussed beliefs in relation to two inversely related dimensions of affect, the ones of stability and intensity. He suggested that beliefs, like attitudes, but in contrast to emotions, are relatively stable, and that they are less intense (“colder”) than both attitudes and emotions (p. 578). Goldin (2002) defined beliefs as specific “cognitive/affective configurations” (p. 64) with a somewhat stronger cognitive element than attitudes and emotions. He also suggested that the affective component is not an inessential add-on to cognition, but a representational mechanism that serves to encode different forms of information. In general, then, beliefs are seen as value-laden, and they are characterized by a certain degree of commitment, either positive or negative. This relates to the claim that beliefs are often associated with a vision of “alternative worlds,” for instance in the form of a utopia (Abelson, 1979; Nespor, 1987).

Third, beliefs are generally considered temporally and contextually stable reifications that are likely to change only as a result of substantial engagement in relevant social practices (Borko & Putnam, 1996; Calderhead, 1996; Cooney, Shealy, & Arvold, 1998; Gill, Ashton, & Algina, 2004; Kagan, 1992; Lloyd, 2005; Mansour, 2009;

Richardson, 2003). For teachers such experiences may stem from their personal lives, their own schooling, their teacher education programs, and their collaboration with colleagues. Stability generally implies that belief change is expected to be a long-term endeavor. There are, though, exceptions (e.g., Liljedahl, 2010), and the qualifier ‘substantial’ (in ‘substantial engagement’ above) refers to experiences that are personally significant, rather than to the duration of the involvement. Pre-existing beliefs are considered “tenacious, even in the face of contradictory evidence” (Kagan, 1992, p. 76), and phrased in the constructivist terms that guide the larger part of the beliefs literature, belief accommodation is not easily accomplished.

Fourth, and as discussed above, beliefs are expected to significantly influence the ways in which teachers interpret and engage with the problems of practice. Sometimes this is an explicit part of the definition (e.g., Mansour, 2009; Op’t Eynde, de Corte, & Verschaffel, 2002), but even when impact is relegated to a formally less prominent position, beliefs are generally expected to be influential (Cross, 2009; Levin & Nevo, 2009; Nathan & Knuth, 2003; Nathan & Koedinger, 2000; Pajares, 1993; Peterson, Fennema, Carpenter, & Loef, 1989; Rokeach, 1969; Schoenfeld, 1998; Speer, 2005; Törner et al., 2010). This is so even though the expectation of causality between beliefs and practice has been challenged by suggestions that there is a more dynamic and reflexive relationship between the two.

To sum up, there is a common core to the concept of teachers’ beliefs in the literature. The term is used to designate individual, subjectively true, value-laden mental constructs that are the relatively stable results of substantial social experiences and that have significant impact on one’s interpretations of and contributions to classroom practice (Skott, 2013). Consider, for example, beliefs that science is for boys, that for any task in mathematics there is one best way to solve it, and that students need hands-on activities to learn with understanding. Each of these may be held with varying degrees conviction (subjective truth) and commitment (affect), be the result of long-term experiences with school science and mathematics, and inform the teacher’s interpretations of and contributions to classroom processes.

Besides this defining core, beliefs are described along a number of different dimensions relating to how they are held. Rokeach (1969) considered them conscious or unconscious and therefore not necessarily explicit. Green (1971) suggested that beliefs are held in clusters, i.e., as distinct sets of beliefs that are to some extent internally coherent, but held in relative mutual isolation. He also said that they may be primary or derivative in terms of their mutual “quasi-logical relationship,” central or peripheral in terms of psychological significance, and held with or without experiential evidence to support them. Building on both Rokeach (1969) and Green (1971), Cooney et al. (1998) suggested that it may not be the content of teachers’ beliefs as much as the ways in which they are held that matter for professional development. Especially, they found that prospective teachers isolated their current beliefs from or connected them with the priorities and practices of their preservice program in a variety of ways that significantly influenced their professional development.

Despite the shared core and characteristics of the concept of beliefs, it is still somewhat underspecified and there is little consensus on how to distinguish it from attitudes, values, and world views, terms that are also used in the literature. Although belief research has contributed significantly to our understanding of the

sense teachers make of their professional tasks and of how they contribute to classroom interaction, one may claim that to some extent we still do not know what we are talking about, when we talk about beliefs.

Methodological Issues

The problem of defining the concept of beliefs contributes to the non-trivial question of how to operationalize it, which in turn creates significant methodological difficulties. Two sets of problems appear when using short-answer, standardized instruments (Kagan, 1990; Richardson, 1996). First, there are challenges related to the meaning of the items and of the teachers' response to them. Standardized instruments are based on the expectation that the items carry similar connotations for the teacher and the researcher. Also, it is expected that the teacher's response to any item is sufficiently transparent for the researcher to interpret it meaningfully. If either of these assumptions does not apply, any inference of the teacher's beliefs is unwarranted. Second, standardized instruments may impose a set of beliefs on the participants rather than elicit their own. Ernest (1991), for example, presents three views of mathematics, the ones of (1) a toolkit of unrelated, but useful facts and procedures; (2) a body of knowledge that exists in a Platonic realm; (3) a problem-driven human creation. If these views are used as a basis for surveys and interview protocols, they impose a set of possible alternatives on the teacher rather than interpret the sense (s)he makes of educational issues (Wedegé & Skott, 2006).

Addressing such problems, Abd-el-Khalick & Lederman (2000) suggest adopting a more interpretive stance and recommend using qualitative interviews to generate more "faithful representations" of the participants' views (p. 674). Others, however, argue that beliefs are elusive and neither the participants' own accounts nor the researcher's classroom observations are windows on what people 'really believe' (Clark & Peterson, 1986; Feinman-Nemser & Floden, 1986; Wilson & Cooney, 2002) (see also Hoffman & Seidel, Chapter 7, this volume). As Kagan (1992) pointed out, teachers may not be aware of or not possess a language to describe their own beliefs, and they may engage in similar instructional behavior for many different reasons.

Because of these problems the task for the researcher is to infer or attribute beliefs to research participants based on different types of data. Verbal accounts complement, elaborate on, or specify inferences made from classroom observations in order to piece together an image of teachers' beliefs. This methodological triangulation is based on the assumption of belief stability across contexts, as teachers' self-reports or comments in research interviews are considered different manifestations, but reasonable proxies of their thinking in the classroom. Different methods, then, are expected to shed light on the same underlying construct. Phrased in terms of belief clusters, the quasi-logical coherence of the cluster of beliefs on a subject and its teaching and learning is assumed to dominate the teacher's rhetorical commitment to a reform agenda as well as her instructional decisions in the classroom. The quasi-logic of the interview or survey situation, then, is supposed to be sufficiently similar to that of the classroom for inferences across settings to make sense.

However, methodological triangulation has been challenged on at least two counts. First, it has been suggested that the expectation of contextual stability, is unwarranted. Hoyles (1992) and Lerman (2001), for instance, argue that beliefs are

situated. There may be a “family resemblance” between beliefs espoused in interviews and those observed in classrooms (Lerman, 2001, p. 36), but teachers’ beliefs are “contextualized: to the data-gathering situation; to the interviewer/interviewee relationship; to the location of classroom, laboratory or other setting; to the particular group of students, and so forth” (p. 37). According to Lerman, then, different data sources are unlikely to shed light on the same underlying construct.

Second, it is as Lester (2002) points out logically problematic to infer beliefs from classroom observations, if one is interested in the extent to which beliefs impact practice. Lester originally made his point about students, but it is at least as relevant in relation to teachers. If the intention is to understand if and how teachers’ beliefs relate to classroom processes, it tends to a circular argument if one infers beliefs from classroom observations and explains the observations with the very same beliefs.

One suggestion for how to meet these challenges is to use stimulated recall or some other method of inviting teachers to think aloud about relevant classroom processes (Kagan, 1992; Skott, 2009a; Smith & Neale, 1989). Such methods do not allow access to teachers’ thinking *in* (classroom) practice, but they do provide an indication of their thinking *on* such practice and alleviate, but do not solve, the challenge of assessing teachers’ beliefs in close proximity to instruction.

In spite of the relative advantages of these latter methods the methodological difficulties appear at least partially unresolved. This calls into question the results of the field, as the trustworthiness of any study clearly depends on the degree to which the data generation process allows access to the key construct under investigation.

Revisiting the Belief-Practice Quandary

If beliefs are an explanatory principle for practice there is little more to explain, if one finds a high degree of compatibility between teachers’ beliefs as espoused in interviews or questionnaires and the practices that unfold in their classrooms. However, empirical findings do not always substantiate the congruity thesis (Calderhead, 1996), and Fives and Buehl (2012) even suggested that there are as many studies questioning it as there are supporting it. The other side to the beliefs-as-explanatory-principle premise is that an observed discrepancy between ‘espoused’ and ‘enacted’ beliefs calls for an explanation (Fives & Buehl, 2012; Philipp, 2007). A number of different ones have been suggested.

Observed incompatibility between beliefs and practice is sometimes explained with the conceptual or methodological difficulties of belief research, i.e., with problems linked to the research process itself. It has been suggested that teachers possess multiple beliefs and that different methods provide access to different ones. The ones espoused on the reform in a research interview, for instance, may be overruled in practice by others that are more centrally and/or less consciously held (Bryan, 2012; Philipp, 2007). As a special case of this, Fives and Buehl (2012) argued that beliefs have different functions, as some filter information and experiences, others frame problems, and still others guide action. Incongruities may be found, if the beliefs that guide action and are likely to be observed in instruction differ from the ones that filter and interpret information and are more readily accessible in research interviews. Also referring to the problems of method, Speer (2008) argued that

incongruences arise because analyses of classroom interaction do not pay sufficient attention to detail, and that higher congruity levels would be found, if they did.

Incongruities may also be explained with constraints on belief enactment attributed to characteristics of the individual teachers or of institutional factors. A description of an inconsistency between beliefs and practice may carry connotations of the teacher being inconsistent. Also it has been suggested that teachers are not sufficiently knowledgeable about the rationale and teaching-learning processes connected to reform initiatives, even when their (more affective) beliefs are in line with them (Abd-el-Khalick & Lederman, 2000). Still other studies point to a dominant school culture, time constraints, curricular materials, and assessment practices as intervening, institutional variables that modify belief enactment (Brickhouse, 1990; Brickhouse & Bodner, 1992; Ernest, 1991; Keys, 2005; Lederman, 1992).

Adopting a somewhat more dynamic perspective on the role of teachers' beliefs for practice, Schoenfeld (2011) subsumed beliefs under the broader heading of orientations and combined their significance with teachers' resources (most notably knowledge) and goals. In this interpretation there seems to be a dual dynamic involved in teachers' enactment of content related beliefs. It depends on classroom contingencies (e.g., a student making a surprising observation or suggestion) and subsequently on changing relationships between the orientations, resources, and goals brought to the classroom by the teacher and goals that arise in the situation.

Except for explanations referring to the conceptual and methodological difficulties of the field, the approaches above modify the expectation of immediate belief impact. However, they also come to the rescue of the premise that teachers' beliefs are the default explanation for classroom practice. They do so by pointing to reasons why specific, subject-related beliefs—still understood as relatively stable, reifications of prior experiences—do not play prominently in the particular situation.

TOWARDS A PARTICIPATORY APPROACH

The core of the concept of beliefs suggests that teachers acquire and possess reified, mental constructs on the basis of comprehensive social experiences. Subsequently these beliefs take on a life of their own and function as co-determiners of teachers' actions in the classroom. This is in line with the constructivist foundation of the larger part of the field and involves a parallel to von Glasersfeld's comment that radical constructivism "starts from the assumption that knowledge, no matter how it be defined, is in the heads of persons" (1995, p. 1). Similarly, belief research starts from the assumption that beliefs, no matter how they are defined, are in the heads—or emphasizing affective issues, in the hearts—of people. This links belief research to acquisitionism with its metaphorical connotations of "knowledge as a kind of material, of human mind as a container, and of the learner as becoming an owner of the material stored in the container" (Sfard, 2008, p. 49). It also sets the field at odds with the trend in some parts of education to conceptualize human functioning in more social and participatory terms (Lerman, 2000), a trend that shifts the emphasis from knowledge and beliefs to a more dynamic interpretation of situated or contextually embedded knowing and believing in action.

Schoenfeld's recent work (2011, described above) adopts a more dynamic perspective than most on the role of teachers' beliefs for classroom practice, but

maintains the acquisitionist underpinnings of other parts of the field. I have suggested elsewhere (Skott, in press) that other dynamic interpretations of the beliefs-practice quandary acknowledge the significance of context as more than a possible constraint on an otherwise autonomous enactment of teachers' beliefs (in one or other understanding of 'context,' cf. Skott, 2009a). Some argue that teaching is a multifaceted, interactional endeavor, and as classroom practices emerge the teacher may base instructional decisions on other beliefs than those related to the contents of instruction (Fives & Buehl, 2012). In a particular situation she may become concerned with manifesting her own professional authority, managing the classroom, or taking a broad view of students' needs, rather than facilitating their subject matter learning (Skott, 2001; Sztajn, 2003). In this interpretation, immediate classroom interaction, as well as the teacher's sense of the broader institutional setting, play decisive roles for which of the teacher's beliefs are activated at the instant.

Others suggest that beliefs are situated (Hoyles, 1992; Lerman, 2002; Mansour, 2009). In this interpretation it is not the selection of beliefs for the purposes of the specific interaction that changes, but the content of the beliefs themselves. Hoyles worked with a female teacher who taught a group of high achieving girls, and suggested that in instruction the teacher's beliefs about mathematics and its teaching and learning (her "mathematical perspectives") depended on her students' age, gender, and perceived ability level (1992, p. 40). In this interpretation teachers may hold multiple, even contradictory beliefs, depending on the context. This does not necessarily question the premise that teachers' beliefs, still understood as reified prior experiences, dominate practice, but suggests that different situations allow the teacher to gain different experiences to reify. Consequently their beliefs differ across contexts.

Finally, one may adopt an emergent perspective on classroom processes. Cobb and Yackel (1996) interpret teachers' and students' classroom activity in terms of a reflexive relationship between individuals' beliefs and understandings on the one hand and classroom norms and practices on the other. In this interpretation classroom interaction forms the backdrop and exerts considerable influence on teacher's situated sense of the instructional enterprise, while teachers' actions, informed by their emerging beliefs, co-constitutes the situation as perceived by both teacher and students. The contents of teachers' beliefs, then, relate dynamically to classroom interaction and to the broader social context in which they emerge.

This view of belief-practice relationships entails a more dynamically social understanding of human functioning than the ones mentioned above. Cobb used this framework to analyze classroom practices while focusing on the students and emphasized that it involves coordinating participatory accounts of communal activity and acquisitionist analyses of individual student's learning (e.g., Cobb, 1999). Similarly, the framework may be used to analyze the relationships between the teacher's emerging beliefs and her participation in unfolding classroom events. In this case the notion of 'a relationship' between beliefs and practice implies only an analytical separation between the two, rather than a more fundamental distinction. The approach coordinates acquisitionist analyses of teachers' beliefs with more participatory analyses of classroom interaction.

I suggested recently that yet another framework, relying only on participationism, may be useful for the purpose of understanding the role of teacher for emerging

classroom practices (Skott, 2013; Skott, Larsen, & Østergaard, 2011). The framework, called Patterns of Participation (PoP), is inspired by social practice theory (Holland, Skinner, Lachicotte Jr, & Cain, 1998; Lave, 1988; Lave & Wenger, 1991; Wenger, 1998) and symbolic interactionism (Blumer, 1969; Mead, 1913, 1934). In line with the emergent perspective it views classroom practices as dynamic and evolving outcomes of individual and communal acts of meaning-making, and it does not view the teachers' contributions to the interactions as an enactment of reified, prior experiences. Rather, it interprets teaching as meaningful reengagement in the practices that in belief research are assumed to be the basis for the reifications. Consider, for example, a teacher working with a group of students who have trouble with a textbook task in mathematics. The teacher's engagement in the mathematical discourse may change, if she is simultaneously reflecting on the reform as discussed in a recent teacher development program; positioning herself in a team of teachers, whose cooperation focuses on the well-being of individual students rather than on their subject-matter learning; and manifesting her professional authority, as her mathematical competence was recently questioned at a meeting with the parents. In this interpretation, the teacher draws upon and renegotiates the meaning of these prior social practices during classroom interaction. The meaning of high-quality teaching in the reform, for instance, may be transformed beyond recognition, as the teacher, in symbolic interactionist terms, becomes an object to herself and at the instant takes the attitude to herself of weak and vulnerable students seeking to find the correct answer to the task; of colleagues who emphasize the significance of students' self-esteem; and of parents, who argued that teachers' professional competence is reflected in their students' proficiency with standard procedures.

This offers a different perspective than in mainstream belief research on how teachers function in classrooms, and it questions the assumption of beliefs as the default explanation for practice. From this point of view the research task is not to get access to reified mental constructs in the form of beliefs, but to disentangle patterns in the teacher's reengagement in other past and present practices in view of the ones that unfold at the instant.

DISCUSSION

The approaches discussed in the previous section conceptualize practice and context differently. However, they all adopt a more participatory stance than more traditional research on teachers' beliefs and are more in line with the social interpretations of human functioning that have become influential in other parts of education over the last decade or two. They shift the unit of analysis from mental reifications *per se* to (some understanding of) person-in-practice. As a consequence they relate differently to the problems of the traditional field of beliefs as outlined previously.

These approaches all do away with the belief-practice quandary in its classical form, as none of them argue *a priori* that previously reified and contextually and temporally stable beliefs about the subject matter and its teaching and learning determine or significantly influence classroom practice. The first two, the ones of belief activation and of situatedness, consider beliefs influential, mental reifications, but in comparison to mainstream belief research they question, respectively, the expectation that the beliefs that dominate teachers' contributions to practice

are necessarily linked to the contents of instruction and that they are necessarily contextually stable. They provide explanations for challenges to the congruity thesis that situate the acts of teaching in some (but different) understandings of context, and by doing so they do away with the a priori expectation that teachers' content related beliefs are stable and play prominently in practice. However, they face the same methodological problems of access to teachers' beliefs as the traditional field with the added complexity that they require one to attribute a greater variety of beliefs to teachers in order to understand instructional activity.

In contrast, the third approach, the emergent perspective, argues that there is a reciprocal relationship between immediate social interaction and teachers' beliefs, while the fourth, PoP, limits the emphasis on reifications and suggests that there is little of any consequence beyond participation in immediate and other past and present practices. This alleviates, but does not solve, the methodological problem of the traditional field, as teachers' participation in discursive or other social practices is more readily accessible than their beliefs, understood as purely mental phenomena. However, it presents methodological problems of its own, as there is no immediate access to significant prior practices such as the discourses of the reform in a teacher education program that the teacher has already left. One has to rely on the teacher's rhetorical commitments to the reform discourse as well as on transformations of such commitments as they evolve in classroom interaction. Also, these latter approaches require the generation of broader sets of data than traditional belief research (Cobb, McClain, de Silva Lamberg, & Dean, 2003; Skott, 2013). Beyond interviews and classroom observations on individual teachers, they call for observations of team or department meetings, interviews with colleagues and the school management, and participation or observation of less structured activities such as staff-room conversations. One may argue that this is just an extension of methodological triangulation as promoted in mainstream belief research. However, these different methods are not expected to shed light on the same underlying construct, i.e., on teachers' stable beliefs, but to generate data on their participation in decidedly different social practices and allow interpretations of how these other practices link to the ones that emerge in the classroom.

CONCLUDING REMARKS

The discussion of the problems of research on teachers' beliefs may suggest that the field is in a crisis. The key construct of the field, the one of beliefs, is ill-defined; its methods are acknowledged to be problematic; and the fundamental rationale, the one of beliefs as an explanatory principle for practice, is refuted as much as confirmed. One may ask why the field continues to attract so much attention.

In spite of the difficulties, however, research on teachers' beliefs has contributed with novel understandings of teachers' thinking and meaning-making as it relates to the contents, to the students, and to themselves as teachers, doers, and learners of the contents. Also, the field has developed new interpretations of the role of the teacher for classroom practice, of the complexities of instructional activity, and of the difficulties involved in teacher development. With its emphasis on meta-issues, the field complements research on teachers' knowledge (Ball, Thames, & Phelps, 2008; Shulman, 1986, 1987; Windschitl, 2004) and the more recent interest in teacher

identity (Olsen, 2008). However, the most significant results of the field are the challenges and modifications developed to its own initial *raison d'être*, i.e., to the expectation of belief impact. The main argument of the present chapter is that these challenges invite us to reconsider the definitions and methods of the field, as well as the acquisitionist underpinnings.

In education, belief research developed in tandem with the constructivism, and it is to a large extent informed by constructivist conceptualizations of the individual. While still influential, constructivism has been challenged by more participatory accounts of learning and knowing. There seems to be some potential in a similar shift in research on teachers' beliefs, even though more participatory approaches present challenges of their own (cf. the discussion above). This shift entails changing the unit of analysis from individuals' beliefs, acknowledging the significance of context, and focusing on some understanding of person-in-practice.

One final comment should be made about the rationale of a more participatory approach. I suggested earlier that there were two reasons for the initial research interest in teacher thinking. One was to understand the role of teachers for classroom practice, especially as seen from the perspective of the teachers themselves; the other was to solve the problems of implementation. Any possible relationship between the two may also be found in the literature.

In the present chapter I have emphasized the problems of an acquisitionist approach focusing on the latter of the two intentions and advocated a more social one that shifts the emphasis towards understanding the role of the teacher for the practices that emerge in the classroom. I suggest that a reasonable agenda for a field of research interested in teachers' thinking, including her engagement in meta-discourses on content, students, learning, and teaching, is to develop accounts of how such thinking relates to the educational experiences of teachers and students. This requires interpretations of how classroom interactions relate to the teacher's participation in a range of other practices at and beyond the school and classroom in question. This emphasis on understanding rather than implementation does not necessarily indicate an acceptance of current approaches and lack of a different vision for what educational experiences may look like. It acknowledges, however, that classroom practices, like any practice, are social, and not the exclusive outcome of any individual's actions. As a consequence it also acknowledges that the experience of the last 30 years suggest that more modest expectations should be set for the contributions to educational reform than those of the initial field of teachers' beliefs.

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3

HISTORICAL OVERVIEW AND THEORETICAL PERSPECTIVES OF RESEARCH ON TEACHERS' BELIEFS

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In the last 20 years, research on teachers' beliefs, their relationships to students' motivation and learning, and the difficulty of changing those beliefs has increased dramatically. In this chapter, key theoretical perspectives that have been useful in guiding this research will be briefly reviewed in a historical overview with discussion of important contributions to advancing research on teachers' beliefs. These perspectives include the study of teachers' beliefs from various orientations, including personality, philosophical analysis, constructivist and sociocultural theories, beliefs as emotional and motivational constructs, teaching as persuasion, modifying teachers' beliefs as a process of conceptual change, and developing and supporting beliefs from an ecological perspective.

Interest in the study of teachers' beliefs has evolved gradually over the last 60 years. In this chapter, its evolution will be illustrated through an exploration of the changing perspectives on the study of teachers' beliefs as described in major references: the four editions of the *Handbook of Research on Teaching* (Gage, 1963; Travers, 1973; Wittrock, 1986; Richardson, 2001), the three *Handbooks of Educational Psychology* (Berliner & Calfee, 1996; Alexander & Winne, 2006; Harris, Graham, & Urdan, 2012), and seminal journal reviews (i.e., Kagan, 1992; Pajares, 1992; see Table 3.1). Conclusions focus on an assessment of the extent of progress in the study of teachers' beliefs. Recommendations for better theoretical integration and research directions are discussed.

BELIEFS AS A CENTRAL COMPONENT OF PERSONALITY

Prior to the publication of the first *Handbook of Research on Teaching* (Gage, 1963), only a few studies of teachers' beliefs were conducted, and most were dissertation studies. The dominance of behavioristic theory during the 1940s and 1950s discouraged research on cognitive constructs, such as beliefs, which is reflected in the

Table 3.1 Chronology of Handbook Chapters, Seminal Papers, and Theoretical Perspectives

Year	Source, Editor(s) (if applicable)	Author(s)	Theoretical Perspectives
1963	<i>Handbook of Research on Teaching</i> , Gage	Getzels & Jackson	Beliefs as Core of Personality
1973	<i>Handbook of Research on Teaching</i> (2nd ed.), Travers	Price	Epistemological Beliefs
1986	<i>Handbook of Research on Teaching</i> (3rd ed.), Wittrock	Fenstermacher Erickson	Beliefs as Practical Arguments Beliefs as Sociocultural Critical Theory
1987	<i>Journal of Curriculum Studies</i>	Nespor	Beliefs as Affective
1990	<i>Handbook of Research on Teacher Education</i> , Houston, Haberman, & Sikula <i>Educational Psychologist</i>	Pintrich	Belief as Motivational and Affective Change: Social Cognitive Constructivism
1992	<i>Review of Educational Research</i>	Kagan Pajares	Conceptual Change Conceptual Change
1996	<i>Handbook of Educational Psychology</i> , Berliner & Calfee	Calderhead Snow, Corno, & Jackson	Beliefs as Cognition Beliefs as Affective and Cognitive Constructs
1998	<i>Educational Psychologist</i>	Dole & Sinatra	Conceptual Change
2001	<i>Handbook of Research on Teaching</i> (4th ed.), Richardson	Munby, Russell, & Martin	Teacher Belief Change
2003	<i>Educational Psychology Review</i>	Gregoire	Conceptual Change
2006	<i>Handbook of Educational Psychology</i> (2nd ed.), Alexander & Winne	Mason & Murphy Woolfolk Hoy, Davis, & Pape	Belief Change: Conceptual Change vs. Persuasion An Ecological Perspective on Beliefs
2012	APA Educational Psychology Handbook, Harris, Graham, & Urdan	Fives & Buehl	An Integrative Perspective on Beliefs

lack of references to teachers' beliefs in the subject indexes of the first three volumes of the *Handbook of Research on Teaching*. In the first *Handbook* (Gage, 1963), the topic of teachers' beliefs was not included in the table of contents or the index. However, Getzels and Jackson's (1963) chapter on "The Teacher's Personality and Characteristics" offers interesting insights with relevance for research on teachers' beliefs. The authors reviewed in detail the development of the Minnesota Teacher Attitude Inventory (MTAI; Cook, Leeds, & Callis, 1951) and efforts to assess its reliability and validity. Without addressing the issue of the distinction between attitudes and beliefs that has a rich history in social psychology that needs to be incorporated into the study of teachers' beliefs (see Banaji & Heiphetz, 2010), the history of the MTAI is informative, as it clearly was based on the assessment of teachers' beliefs. Consider sample items used with a Likert response scale: e.g., "Children should be seen and not heard"; "boastful child[ren are] usually over-confident of [their] ability." (p. 508). The description of the MTAI in the 1951 Manual (as cited by Getzels & Jackson) touts its "high reliability" and value in predicting teachers' ability "to get

along with pupils” and indirectly the teachers’ satisfaction with teaching as a career (p. 508). The hope of many educators and policymakers at the time was that the MTAI could be used to select candidates for teacher education and for teaching positions. The development of the inventory was impressive in some ways. As Getzels and Jackson described the process, the developers began with 350 items, stated in the negative and positive format for a total of 700 items. In a validation study of a randomly selected sample of 100 teachers of grades 4 through 6, the teachers’ scores on the 164 items selected for use in the final inventory and three independent measures of teacher-student rapport were used: principal ratings, researcher ratings of observations of the teachers in their classrooms, and student ratings of their teachers on a 50-item questionnaire. Other strategies used in the research were problematic. Selection of discriminating items was determined empirically by asking principals to identify teachers they considered “superior” and “inferior” in maintaining “harmonious relations” in their classrooms. Despite the many items on the inventory on a range of varying topics, the researchers used only a total score in the analysis. A couple of factor analyses were reported supporting only a one-factor solution, but analytical procedures were of questionable validity.

Over 60 studies were conducted with the MTAI, but the results failed to meet the high expectations of its advocates. Inconsistencies of results in numerous studies raised questions about the validity of scores on the inventory. Some research results suggested the possibility that scores on the measure could be faked. Della Piana and Gage’s (1955) study of 97 teachers in grades 4 through 6 and their 2,700 students has particular relevance for future research on teachers’ beliefs. Their results suggested the possibility of an interactive effect of teachers’ MTAI scores and students’ values (preference for teachers with a cognitive focus vs. those with an affective focus) on students’ reported liking of their teachers. Although the researchers’ analyses of their data are questionable from the perspective of current standards of design and analysis, this study suggests the current need to investigate the interactive effect of teachers’ beliefs and students’ beliefs, needs, and preferences on students’ motivation and achievement.

In concluding their chapter, Getzels and Jackson (1963) lamented the lack of progress made in understanding the relationship between teachers’ personality and their teaching effectiveness. They attributed the problem to three major obstacles that have a disturbing similarity to current problems in research on teachers’ beliefs: lack of an adequate definition of personality, the inadequacy of measures, and the lack of adequate measures of teacher effectiveness, which were primarily ratings that were inconsistent across raters. To these three problems, Getzels and Jackson added the tendency that still occurs too often in contemporary research: failing to control for teachers’ gender, age, grade level, and subject matter, and variations in school-, community-, and class-level variables, including the students’ achievement levels and SES. Getzels and Jackson attributed these problems largely to the lack of a theoretical basis for the research. They elaborated on this problem based on issues raised by the American Educational Research Association Committee on the Criteria of Teacher Effectiveness (1952, 1953). Getzels and Jackson’s discussion of the importance of grounding research on a firm theoretical basis merits review today, as many reports of research still lack adequate theoretical support. As for the future of the MTAI, use of the instrument virtually disappeared shortly after publication of the Getzels and

Jackson chapter. For an update on the problems associated with the use of measures of beliefs and attitudes in selecting teachers, see Metzger and Wu (2008), cited by Fives and Buehl (2012). Research on attitudes continued in the interval between the first and second handbooks, but rather than focus on the assessment of teachers' attitudes, the emphasis was on the teaching of positive attitudes to students.

A DREAM DEFERRED?

The second *Handbook of Research on Teaching* (Travers, 1973) reflects the editor and authors' disappointment in the lack of progress made in educational research in the 10 years following the publication of the first *Handbook* relative to the amount of US federal funding received. The editor wrote, "The heavy emphasis in this volume on what is wrong with educational research . . . reflects the general level of inadequacy of much of the research" (p. vii). In this volume, the topic of teachers' beliefs appeared on only one page, according to the index. Price (1973) mentioned the need to conduct empirical studies of how teachers' belief in a theory of knowledge might affect their beliefs about education, an early insight into the importance of the study of epistemological beliefs.

Notably, Peck and Tucker (1973) in their chapter on teacher education in the *Second Handbook* were optimistic about the research on teacher education emerging as the result of the influx of federal funds for the study of teacher education. They explained that the complexity of the process of teacher education could not be adequately studied by independently conducted studies by single individuals, and the emergence of research centers that created collaborations within and across teacher education schools, colleges, and universities held the promise of significant progress. Their review focused on the encouraging results of experimental studies designed to increase teachers' skills in instruction and motivation as well as socioemotional relationships with students. Although the topic of beliefs was never mentioned in the chapter, the increases in preservice teachers' skills and self-regulation reported in these studies were undoubtedly mediated by changes in their beliefs. In their conclusion to the chapter, however, Peck and Tucker did not sustain their earlier optimism. They cautioned that the growth of federal funding that seemed so promising from 1963 to 1968 had slowed "almost to a halt" (p. 971), and their hopes for a future in which systematic collaborative research would guide the development of a more theoretically and empirically grounded performance-based approach to teacher education would likely be deferred.

RUMBLINGS OF PARADIGM SHIFTS

In the 13 years between the publication of the second and third handbooks, as findings from experimental studies of teaching practices increased, some educational theorists began to question the appropriateness of the trend toward training teachers to apply research-based teaching practices, and recognition of the importance of teachers' beliefs in determining their practice began to emerge. Floden (1985) described three perspectives that challenged the role of researchers and teacher educators as experts who provide research-based conclusions for adoption by educational practitioners (e.g., Buchmann, 1984; Fenstermacher, 1979; Zumwalt, 1982).

The advocates of these perspectives proposed that researchers and teacher educators should engage teachers in discussions about teaching and leave the drawing of conclusions for practice to teachers. Fenstermacher, in particular, emphasized the importance of teachers' beliefs as a major determinant of their practice that had the potential to enable them to meet the moral responsibilities of their work. Floden objected to the advocates' notion that using persuasion (i.e., rhetoric) in the education of teachers must be abandoned. Instead Floden argued that the problem is the type of persuasion used rather than persuasion per se. He acknowledged the validity of the advocates' position that the rationality of teachers must be respected and engaged but maintained that persuasion is appropriate if it is based on sound reasons and allows teachers the opportunity to openly question their instructors and receive reasonable explanations of the grounds for researchers' conclusions. This controversy lingers in the current literature on teachers' beliefs (see, for example, Alvermann, 2001).

PARADIGM PROLIFERATION (TEACHER THINKING, INTERPRETIVE AND SOCIOCULTURAL ANALYSIS)

The difference in the attitudes regarding the quantity and quality of the research available for review of the editor Wittrock (1986) and chapter authors of the third *Handbook of Research on Teaching* compared to the attitudes of the editor and authors of the second *Handbook* (Travers, 1973) is dramatic. Unlike the previous editor's disappointment with the quality of research and the authors' difficulty in finding important research grounded in coherent and integrative models and theories of teaching, Wittrock heralded the flourishing of research on teaching and reported that all the chapter authors described significant advances in research. Several chapters revealed new programs of research in interpretive analysis of classroom ecologies and cognitive science that were laying the foundation for the emergence of research on teachers' beliefs.

In the introductory chapter of the third *Handbook*, Shulman (1986) described the process-product approach to studying teaching (that is, the behavior-oriented research paradigm that was dominating educational research), and highlighted the emergence of several new research programs that were challenging that dominance. Among these challengers, Shulman noted fledgling efforts to introduce more cognitive variables into the study of teaching, and he referred to this new paradigm as *teacher cognition and decision making*. As a representative of this paradigm, Clark and Peterson's (1986) chapter on teachers' thought processes included a section on "Teachers' Theories and Beliefs." In the 11 pages of that section Clark and Peterson provided a review of the research on teachers' attributions for students' performance and called for research on the relationship between teachers' attributions and their planning and interactive decision making and student achievement. They also discussed research on teachers' conceptions of teaching, learning, and reading, their role as teachers, their beliefs about teaching in open education settings, and principles of practice. Erickson's (1986) chapter on the qualitative, interpretive perspective promoted the widespread adoption of research methods that have contributed to our study of and understanding of teachers' and students' beliefs.

Fenstermacher's (1986) chapter on the appropriate use of research findings from a philosophical perspective merits reconsideration for its potential to improve teachers' use of research in their practice. Concerned about the lack of attention to the "profoundly moral task" of education (p. 37), Fenstermacher used a multidisciplinary analysis: (a) philosophical concept analysis to clarify the meaning of teaching, (b) philosophy of science to differentiate between the roles of knowledge production and knowledge use, and (c) moral theory to explain that the appropriate use of research is to alter "the truth or falsity of beliefs that teachers have, as it changes the nature of these beliefs, and as it adds new beliefs" (p. 43). Fenstermacher viewed these beliefs as the basis for "practical arguments, or some similar way of acknowledging purposive, passionate, intuitive, and moral properties of human action . . . the methods for transforming what is empirically known and understood into practice" (p. 44). In sum, Fenstermacher described an educationally sound approach for researchers and teacher educators to use educational science to help preservice and inservice teachers develop rationally defensible beliefs that would enable them to fulfill the moral responsibilities of teaching.

CLARIFYING THE CONSTRUCT OF TEACHERS' BELIEFS

Following the publication of the third *Handbook of Research on Teaching*, several seminal papers appeared that provided the impetus for greater interest in the potential of research on teachers' beliefs to inform educational practice. Concern about the distinction between beliefs and knowledge was increasing. Nespor (1987) applied Abelson's (1979) psychological analysis of the distinction between knowledge systems and belief systems to develop a preliminary model of belief systems as a framework for future research that was theoretically grounded in cognitive science, and he offered some empirical support for the model from his field-based study of the beliefs of eight eighth-grade teachers over a semester using videos and interviews. The seven features Abelson described as the "hot cognition" that distinguishes knowledge systems from belief systems bear repeating:

1. The elements (concepts, propositions, rules, etc.) of a belief system are not consensual. [They are idiosyncratic and personally derived from experience.]
2. Belief systems are in part concerned with existence or nonexistence of certain conceptual entities (e.g., God, Extra Sensory Perception).
3. Belief systems often include representations of "alternative worlds," typically the world as it is and the world as it should be.
4. Belief systems rely heavily on evaluative and affective components.
5. Belief systems are likely to include a substantial amount of episodic material from either personal experience or (for cultural belief systems) from folk lore or (for political doctrines) from propaganda.
6. The content set to be included in a belief system is usually highly "open."
7. Beliefs can be held with varying degrees of certitude.

(pp. 356–360)

In discussing how these seven features might affect "how teachers learn and use what they learn" (p. 324), Nespor (1987) focused on the fourth feature, emphasizing

that the emotions and affect inherent in beliefs shed light on their appeal to teachers and the tenacity with which they may be held in the face of contradictory evidence. Nespor suggested that, for teachers, beliefs may seem better suited to helping them cope with “the ill-structured” and “deeply entangled” problems of teaching than research-based knowledge or academic theory (p. 324). Nespor concluded by noting that we lack sufficient understanding of the nature of beliefs, how they develop, the supports and challenges to them, and how to foster them, a theme that is echoed in Fives and Buehl’s (2012) analysis of current research on teachers’ beliefs.

Almost 20 years after Travers’s (1973) disappointment with the progress in research on teaching and despite having compiled a 925-page volume, Houston, Haberman, and Sikula (1990), editors of the first *Handbook of Research on Teacher Education*, concluded that “there has been notable recent progress, but the research basis for such important work as educating the nation’s teachers is still extremely thin. Although the importance of research is being espoused, little progress is being made” (p. ix). To address the need for more and better research to foster teachers’ development, Pintrich (1990) in his chapter in that volume focused on the need for researchers to integrate research on motivation—particularly teachers’ beliefs and emotions—into their cognitive models to yield more comprehensive models of teaching and student learning. In synthesizing the psychological literature on the issues of what develops during teacher education and how it develops, Pintrich applied a general social-cognitive perspective. From the cognitive perspective he noted that “teachers are active thinkers, decision makers, reflective practitioners, information processors, problem solvers, and rational human beings” (p. 827) and that, from the social perspective, teachers are embedded in a social context that may advance or inhibit their cognitive processing. To study what develops in teacher education, Pintrich emphasized that in their models of teacher thinking and teaching, researchers must integrate “the hot cognitions of self-beliefs and motivation . . . along with the cold cognitions of knowledge and cognitive skills” (p. 827). Although he avoided a discussion of the distinction between knowledge and beliefs, Pintrich highlighted the expectancy-value model of motivation (Eccles et al., 1983) with his addition of other motivational components as useful for analyzing research (Pintrich, 1990, p. 842). He included two types of beliefs as central to the three motivational components in the model: “(a) beliefs about the importance and value of the task (value components), (b) beliefs about one’s ability or skill to perform the task (expectancy components), and (c) feelings about the self or emotional reactions to the task (affective components)” (p. 842). Pintrich emphasized the power of a dynamic conception of self that includes multiple views of the self (e.g., past, present, and future selves, the achieving self, the nurturing self, the anxious self) and suggested that this dynamic conception of the self “proposes a mechanism by which the active self mediates and provides continuity between the personal characteristics of the individual and the environmental demands of the situation” (p. 837).

In closing, Pintrich (1990) concluded that “a good foundation for research and model building in learning and development” comprises four general domains—(a) teacher knowledge, (b) thinking and problem solving, (c) metacognition and self-regulation, and (d) motivation, and he recommended that “a general constructivist paradigm could be the most fruitful approach to pursue for research” (p. 850).

To change teachers' beliefs, Pintrich was one of the first analysts to recommend the application of the conceptual change literature (Posner, Strike, Hewson, & Gertzog, 1982). Pintrich pointed out that teachers' epistemological beliefs about the nature of teaching and learning might be a particularly appropriate target for belief change and emphasized the importance of assessing teachers' beliefs prior to teaching to identify beliefs that might interfere with learning.

In 1992 two important reviews of research on teachers' beliefs were published. First, Kagan (1992) offered a valuable analysis of the rapidly growing research literature on the topic and issues that remain relevant for researchers. Distinguishing between knowledge and belief in particular remained a conundrum for researchers. Kagan asserted that "most of a teacher's professional knowledge can be regarded more accurately as belief. . . [whereas] knowledge is generally regarded as belief that has been affirmed as true on the basis of objective proof or consensus of opinion. These are the gauges we use to distinguish facts (knowledge) from mere opinion (belief) in a particular domain" (p. 73).

To illustrate that the research on teachers' beliefs was "a riotous array of empirical research" (p. 66), Kagan (1992) created a 5-page summary table of 25 studies of teachers' beliefs, each one focusing on a different correlate of one of two topics: teachers' sense of efficacy or content-specific beliefs. From her analysis, Kagan described the consistent findings in such studies as showing that teachers' beliefs were, for the most part, stable and resistant to change, and because the beliefs were mostly tacit, they could not be measured reliably through interviews, questionnaires, or inferred from behavior; yet with more subtle indirect methods such as constructing concept maps of their pedagogical understandings and engaging in *think alouds* (in which teachers analyzed their own or others' videotaped performances), teachers revealed that their beliefs were primarily influenced by three contexts: the students, the content, and their experientially derived personal beliefs. Twenty years later, Fives and Buehl (2012) in their chapter in the *Handbook of Educational Psychology* echoed similar conclusions about teachers' beliefs.

In addition to describing the typical characteristics of teachers' beliefs, Kagan (1992) discussed the consistent evidence showing that reading and applying research to their practice had failed to change beliefs of preservice and inservice teachers. This lack of belief change emphasized the need to investigate the processes implicated in changing teachers' beliefs. Kagan, like Pintrich (1990), turned to the literature on conceptual change as a basis for research on changing teachers' beliefs. In particular, she cited Clement, Brown, and Zietman (1989), who emphasized not only the need to identify the "brittle" beliefs that impede conceptual change but also the "anchor" beliefs that foster conceptual change, a potentially useful approach that has received little attention in research on conceptual change.

In the second article published in 1992, Pajares added to Kagan's (1992) insights on the implications of research on teaching and offered his own seminal insights making his article essential reading for teacher educators and researchers studying teachers' beliefs. Pajares focused on clarifying the confusion that has hampered the progress of research on teachers' beliefs in the hope that belief could rise to its rightful place as "the single most important construct in educational research" (p. 329). His commitment to improving the quality of research on teachers' beliefs was motivated by his belief that "beliefs are the best indicators of the decisions individuals make

throughout their lives” (p. 307), as advocated by numerous philosophers throughout history and contemporary psychologists (e.g., Bandura, 1986; Nisbett & Ross, 1980).

Pajares (1992) attributed the confusion evident in the proliferation of psychological constructs (e.g., attitudes, perceptions, perspectives, personal theories), all “aliases” for beliefs, to the lack of a clear distinction between knowledge and beliefs (p. 327). In seeking a clear distinction, Pajares turned to notable theorists (i.e., Nespor, 1987; Nisbett & Ross, 1980; Rokeach, 1968) who argued that belief involves stronger affect and evaluation than does knowledge. However, Pajares suggested that these theorists underestimated the importance of evaluation and affect in knowledge, and he concluded that belief and knowledge are “inextricably intertwined” (p. 325). On the basis of Rokeach’s definition, Pajares proposed a view of beliefs that although not resolving the issue of knowledge and belief offers researchers a basis for a more adequate assessment of teachers’ beliefs than has yet been achieved; that is, belief is “an individual’s judgment of the truth or falsity of a proposition . . . that can only be inferred from a collective understanding of what human beings say, intend, and do” (p. 316). Referring to Rokeach (1968), Pajares (1992) reminded researchers that “beliefs cannot be directly observed or measured but must be inferred from what people say, intend, and do,” adding the admonition: “fundamental prerequisites that educational researchers have seldom followed” (p. 314). In other words, researchers cannot be content with questionnaire assessments of teachers’ self-reports of their beliefs. They must seek carefully conceptualized, integrated, and validated understandings, by focusing on teachers’ context-specific beliefs and their interconnections to other beliefs and behavior. They should use open-ended interviews, observations, and related think-alouds to determine consistencies and inconsistencies between what teachers say, intend, and what they do; reactions to dilemmas that challenge core beliefs; creations of concept maps that identify the connections between educational and personal beliefs; and most important, explorations of the beliefs that lead to motivations and behaviors that affect students’ learning and well-being. Pajares reminded us that “little will be accomplished,” if researchers ignore the need to connect teachers’ beliefs with teachers’ knowledge and practices and student outcomes (p. 327). How, for example, Pajares asked, can teacher educators “make educational beliefs a primary focus of their teacher preparation programs . . . without research findings that identify beliefs that are consistent with effective teaching practices and student cognitive and affective growth, beliefs that are inconsistent with such aims, and beliefs that may play no significant role” (pp. 327–328).

The goal Pajares (1992) set for educational researchers and teacher educators is no small challenge. He ended his review with 16 characteristics of beliefs, each one as daunting as the next, reinforcing the need to recognize the complexity, intransigence, and power of human belief systems to promote development or to hinder it. Our efforts to understand and change them when warranted must be as robust as they are. Of special note, Pajares cautioned researchers about the dangers of a construct as “messy” as teachers’ beliefs in an area as ill-defined as teaching and referred to Nisbett and Ross’s (1980) description of the limitations in human inference that lead to perseveration and rigidity in teachers’ beliefs and to Nespor’s (1987) notion of an entangled domain as examples that leave teachers unable to use cognitive strategies effectively and uncertain about what to do. Pajares elaborated on Abelson’s (1979) and Nespor’s insights on the role of emotion in sustaining teachers’ beliefs

and accounting for their resistance to efforts to change those beliefs. Like Kagan (1992) and Pintrich (1990), Pajares saw hope in the research on conceptual change as a basis for promoting warranted change in beliefs (Posner et al., 1982), and more recent research (e.g., Gill, Ashton, & Algina, 2004) continues to support that effort.

COMING OF AGE OR NOT? THE TENTATIVE LEGITIMACY OF RESEARCH ON TEACHERS' BELIEFS

Growing enthusiasm for the cognitive and social perspectives reviewed in Wittrock's (1986) *Handbook of Research on Teaching* is evident in the first *Handbook of Educational Psychology* (Berliner & Calfee, 1996), the first *Handbook* to include a chapter on beliefs. Calderhead's (1996) chapter entitled "Teachers: Beliefs and Knowledge" offered researchers hope for progress in studying teachers' beliefs. However, despite giving the lead in his chapter title to beliefs, Calderhead devoted less than three pages to research on teachers' beliefs. He reviewed Nespors' (1987) distinctions between knowledge and beliefs, Pajares' (1992) discussion of the functions of teachers' beliefs, and a few studies of teachers' beliefs about teaching, subject matter, learning to teach, self and the teaching role, and the relationship of beliefs to classroom practice, showing the expanding nature of topics of interest to researchers. This last section is most relevant to current concerns because Calderhead focused on the inconsistency between two studies of teacher change: Guskey's (1986) report of a staff development study that Guskey interpreted as showing that changes in behavior precede changes in beliefs, if the behaviors are successful, and Richardson's (1994) report of a staff development approach to changing reading instruction that she interpreted as showing that changes in practices occur with interactions of behavior and belief and that either can initiate changes in practice. Clearly more research on this issue is needed.

The handbook chapter by Snow, Corno, and Jackson (1996) on individual differences in affect and motivation offered important though contradictory theoretical perspectives on teachers' beliefs, reflecting the confusion about the nature of beliefs and the mounting support for acknowledging and studying the role of motivation and emotion inherent in beliefs. Basing their analysis of individual differences on the age-old conception of mental states as consisting of affection, conation, and cognition, the authors included a figure entitled "A Provisional Taxonomy of Individual Difference Constructs" (p. 247). The figure was divided into three separate parts, with affection and cognition on separate ends of the figure and conation in the middle. The construct of beliefs was aligned on the far right of the figure under cognition, specifically under declarative knowledge. In contrast, emotion and attitudes were shown on the far left of the figure under affection; however, the authors' discussion of attitudes and beliefs in the text conflicted with their representation in the figure. In describing the social psychological conception of attitudes, the authors mentioned that "attitudes are usually studied as aggregates of beliefs" (p. 290). Moreover, in the discussion of beliefs, Snow et al. explained that most of the studies of belief in education were cognitive analyses that ignored the affective and conative aspects of beliefs. They cautioned readers that such theories ignore "the emotional or motivational role [of beliefs]. . . . [Beliefs] are not strictly cognitive. . . . The frequent finding that some 'cognitive' misconceptions are deep-seated and resistant to instruction

suggests that they may also have affective roots” (p. 291). In addition, they called for research integrating affective, conative, and cognitive functioning, noting that without including affect and motivation in cognitive models the “dynamic, energizing” aspects of human functioning are lost (p. 295). Thus, although in their preliminary taxonomy, the authors represented beliefs as separate from emotions and motivation, their discussion of the affective and conative aspects of beliefs portended the ultimate abandoning of the cognitive conception of beliefs in social psychology, as evidence of the affective nature of beliefs has mounted (Banaji & Heiphetz, 2010), an insight that warrants further consideration in educational research (for a more elaborate discussion on this topic, see Gill & Hardin, Chapter 13).

ENCOURAGING RESEARCH ON TEACHER CHANGE

As further evidence of the slow pace of progress in studying teachers’ beliefs, in the fourth *Handbook of Research on Teaching* (Richardson, 2001), Munby, Russell, and Martin’s (2001) chapter “Teachers’ Knowledge and How It Develops,” similar to the few pages in Calderhead’s (1996) chapter on beliefs and knowledge, included only one page on teachers’ attitudes and beliefs. Rather than provide descriptions and analysis of research on teachers’ beliefs, the authors presented a brief summary of Calderhead’s discussion of beliefs in his chapter and a summary that failed to do justice to Richardson’s (1996) excellent review of research on teachers’ attitudes and beliefs.

In their chapter on teacher change, Richardson and Placier (2001) did not address teachers’ beliefs directly, but their chapter provided encouraging evidence that challenged the notion of rigid stability of inservice teachers’ beliefs. Although the studies cited continued to support the difficulty of changing preservice teachers’ beliefs, Richardson and Placier concluded that for inservice teachers, “long-term, collaborative, and inquiry-oriented programs appear quite successful in changing beliefs, conceptions, and practices” (p. 921).

INCREASING COMPLEXITY AND THE DESIRE TO RETURN TO SIMPLICITY

The increasing influence of research on teachers’ beliefs is particularly evident in the second *Handbook of Educational Psychology* (Alexander & Winne, 2006), as two chapters are devoted to it. The growing complexity of researchers’ views on teachers’ beliefs is reflected in the decision of Woolfolk Hoy, Davis, and Pape (2006) to organize their review of research on teachers’ beliefs from 1995 to 2006 using Bronfenbrenner’s (1986) ecological model. This decision reflects the many diverse influences and contexts that impinge on the development and enactment of teachers’ beliefs, from the teachers’ own personal characteristics and experiences to the diverse needs and characteristics of the children they teach and their parents’ expectations for both their children and their children’s teachers, the demands of the school, the district, community, state and national context, and the diverse norms and values in the culture. In summarizing their conclusions, Woolfolk et al. expressed concern about the trend that has resulted in “ever more discrete constructs” (2006, p. 730), and they called for a change of direction from such isolated studies of beliefs and knowledge

toward “designs and methodologies that enable us to address the “whole” of teachers’ mental lives” (p. 73). This recommendation encourages the development of research designs that are more theoretically grounded, evidence-based studies that examine the relationship between changes in teachers’ beliefs and their impact on student outcomes, taking into account the multiple influences from the different contexts of Bronfenbrenner’s model.

In their chapter, “Changing Knowledge and Beliefs,” Murphy and Mason (2006) wrestled with two of the most intransigent issues on the topic: (a) distinguishing between knowledge and beliefs and (b) changing teachers’ beliefs. After reviewing previous efforts to distinguish knowledge and beliefs, Murphy and Mason concluded that the two constructs are overlapping and the essential distinction between them is the need to externally validate knowledge.

In their analysis of the process of changing teachers’ beliefs, Murphy and Mason (2006) reviewed research on the two models that have guided most of the research on the topic. Though both approaches are grounded in Piagetian constructivist developmental theory, they have diverged into two relatively distinct approaches driven primarily by their subject matter: on the one hand, science education and, on the other, students’ cognitive development. In addition, Murphy and Mason discussed two more recent models—Dole and Sinatra’s (1998) cognitive reconstruction of knowledge model and Gregoire’s (2003) cognitive-affective model of conceptual change. These two models were proposed to take into account the role of motivation and affect in belief change, as recommended by Nespor (1987), Pajares (1992), Pintrich (1990), and Snow et al. (1996). Both models include a cognitive mechanism for conceptual change (i.e., systematic processing) based primarily on social psychological models of attitude change. In addition to the motivational contributors to belief change incorporated in Dole and Sinatra’s “warm” model of belief change, Gregoire proposed a more comprehensive “hot” model that includes the role of the person’s identity, self-efficacy beliefs, goals, emotions, and prior beliefs in the appraisal process leading to the decision of belief change and the potential for a less intentional approach to belief change through heuristic processing if the appraisal process led to a fear response (i.e., threat) rather than an approach response (i.e., challenge).

In concluding their chapter, Murphy and Mason proposed the need for a theory to unify the disparate approaches to belief change. To offer direction to achieving that goal, they offered a brief description of a theoretical framework based on Peirce’s (1958) conception of beliefs as “conscious, deliberate, habits of action” (p. 320) that would return researchers to their roots in pragmatism. Although the simplicity of such an approach is appealing, it lacks the complexity needed to capture the messy construct that is so multiply determined by unconscious as well as conscious influences implicated in the increasingly multifaceted models of belief change.

UNDERSTANDING TEACHERS’ BELIEFS IN THEIR COMPLEX ECOLOGICAL CONTEXTS

In their chapter in the most recent *Handbook of Educational Psychology*, Fives and Buehl (2012) referred to the complexity of teachers’ beliefs as one of the more prevalent and relevant themes to emerge in the research literature on teachers’ beliefs. This

complexity is particularly evident in their discussion of internal and external supports and challenges to teachers' implementation of their beliefs (pp. 482–484). In their discussion, Fives and Buehl identified several crucial factors that may support or inhibit whether teachers act on their beliefs. First and foremost, Fives and Buehl emphasized the role of teachers' personal beliefs, in particular, beliefs about knowledge, their perceived self-efficacy, and identity. In addition, the authors included factors impinging on the immediate classroom context, such as parents' and students' reactions to teachers' practices. Among the major external supports and challenges, Fives and Buehl considered the dramatic effect of culture on teachers' beliefs across and within cultures and the role that district, state, and national policies can play in influencing the curriculum and resources.

In their analysis of recent research on teachers' beliefs, however, Fives and Buehl (2012) ended their review with a reminder that the high expectations for research on teachers' beliefs are far from fulfilled. They concluded that “the systematic and wide-reaching emphasis on teacher beliefs needed to bring these predictions to fruition has yet to be seen” (p. 490).

Fives and Buehl (2012) recommended that to construct a hierarchy of supports and challenges most needed to enhance teachers' ability to act on their beliefs, these internal and external influences need to be investigated together to identify the most powerful influences. Bronfenbrenner's (1998) bioecological framework is a valuable structure for guiding research and practice based on Fives and Buehl's analysis. The value of Bronfenbrenner's theoretical framework is that it provides a visual representation of the complexity of the multiple contexts as they simultaneously influence teachers' ability to enact their beliefs in their classroom. Moreover, it provides a structure for analyzing and identifying multiple sources for supporting teachers' efforts that can synergistically empower teachers to act on their beliefs if researchers, administrators, and policymakers work to integrate these multiple sources of support rather than focus on single factors whose power is likely to be diminished if not fully supported by other internal and external contextual forces.

CHANGING THE BELIEFS OF RESEARCHERS, TEACHER EDUCATORS, AND EDUCATIONAL POLICYMAKERS

The history of the development of research on teachers' beliefs reviewed here reveals a sluggish start as researchers have wrestled with how to effectively address such a messy construct that overlaps with knowledge and is confounded with emotion, but enthusiasm has swelled in recent years as more researchers recognize that beliefs are a powerful influence on teachers' thinking and behavior. However, the history of the research also reveals an important gap that must be addressed if we hope to make progress in fostering teachers' beliefs that will enhance their performance and well-being as well as their students'. For the most part, researchers, teacher educators, and educational policymakers have held naïve beliefs about the potential of changing teachers' beliefs with short-term experiences. Social psychology and research on teaching have repeatedly shown that belief change is a complex, arduous, and long-term process. From Lortie's (1969) description of the enduring effects of 16 years of observations of teachers' practices on preservice teachers' beliefs about the nature of effective teaching and the discouraging evidence of the instability of change in

teachers' beliefs, it is clear that long-term commitments to longitudinal evidence-based research designs that document this long-term developmental process and its effect on students' motivation and learning are needed.

The success envisioned for research on teachers' beliefs will not be achieved if the research continues to be mostly correlational studies of relationships among teachers' beliefs and other constructs and modest investigations of efforts of teacher educators to modify a few teachers' beliefs. As Fives and Buehl (2012) pointed out, the many qualitative studies of small numbers of teachers conducted in the last 20 years are a rich source of ideas, but they need to be validated in further research. Indeed, the research evidence highlighting the difficulty in changing teachers' beliefs and inconsistencies across studies raises doubts about the value of research on teachers' beliefs. Optimistically, the social psychological research continues to offer hope that continuing the effort to study the construct in education can be productive. However, to achieve that goal, much more ambitious, sophisticated, and comprehensive research studies are needed. Consistent with Bronfenbrenner and Morris's (1998) hope for more ecological research, a preponderance of the research should be experimental, keeping in mind Bronfenbrenner's (1976) emphasis on Lewin's dictum, "If you want truly to understand something, try to change it." However, to enhance the chances that research on teachers' beliefs will have the impact on improving teaching and the lives of teachers and students envisioned by its advocates, researchers must embed research on teachers' beliefs in the context of the wider contexts of teaching and teacher education. As Grossman and McDonald (2008) proposed in their advocacy of a more integrative approach to the study of teacher education and teaching, researchers should pool their resources and work on common questions, measures, interventions, and outcomes. They provided examples of initiatives that have fostered such efforts (e.g., the Carnegie Foundation for the Advancement of Teaching). However, the economic climate is threatening progress in educational research with another period of retrenchment reminiscent of the 1960s and 1970s, as once again federal funding disappears. Bolder and more inclusive efforts seem called for. Consider, for example, the Dunedin Multidisciplinary Health and Development Study (e.g., Moffitt, 2011), in which an entire community agreed to participate in a long-term lifespan study of the development of its children. If faculty in colleges and schools of teacher education and school districts work collaboratively to conduct large-scale ecologically based research studies of the multiple contexts affecting teachers' and students' beliefs and their ensuing impacts on teaching and learning, they have the potential to produce a trove of longitudinal data that could yield important insights into teachers' beliefs and the processes by which they impact teaching and students' beliefs, motivation, and learning. Progress is possible especially if teacher education institutions work together to expand their collaborations into large-scale studies of teacher education and teaching that follow their graduates into their professional careers in school districts.

Words of caution, however, are needed. In their chapter, Fives and Buehl (2012) wisely noted the ethical dilemma inherent in trying to change beliefs in light of the uncertainties about the validity of research findings for implementation across different contexts. Awareness of this ethical dilemma heightens the importance of conducting evidence-based experiments with powerful interventions with measures of teachers' beliefs that provide reliable and valid scores capable of predicting effects

on students' motivation and learning. With interventions in teachers' beliefs that are theoretically and empirically grounded in the goal to improve their relationships with their students and their students' motivation and achievement, we can better tackle the ethical dilemmas inherent in belief change.

Pajares (1992), in his effort to clean up the messy construct of teachers' beliefs, offered key questions to guide the design and analysis of studies of teachers' beliefs. In reading this volume and working to improve future research on the topic, we need to heed his advice and ask ourselves these questions:

- Are [the beliefs] clearly conceptualized?
- Are their key assumptions examined?
- Are precise meanings consistently understood and adhered to?
- Are specific belief constructs properly assessed and investigated? (p. 329; see Schraw & Olafson, Chapter 6, this volume, for more on this issue)

Most important to remember, however, is Fenstermacher's (1986) concern that teachers need to be involved in the process of assessing the ethical implications of the research findings to enable them to provide a morally responsible education for their students. To address the ethical issues of education, the following question should be added to the list: Is there a strong theoretical- and empirically-validated foundation to the research of teachers' beliefs that teachers can use to ground their beliefs that will enable them to promote their own and their students' cognitive, emotional, social, and moral development as ultimate goals?

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4

THE DEVELOPMENT OF TEACHERS' BELIEFS

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Teachers hold many different kinds of beliefs simultaneously. They hold beliefs about knowledge (epistemology), their students (e.g., attributions, locus of control, motivation, test anxiety, culture, intelligence), and other beliefs about students and themselves (e.g., self-efficacy, self-worth, self-concept, self-esteem, and sense of agency). Teachers also hold beliefs about their subject matter (content), how to teach (pedagogy), and about the many moral and ethical dilemmas and societal issues that affect their teaching (e.g., politics, poverty, economics). Pajares (1992) identified a long list of other terms used interchangeably in the literature on teachers' beliefs: attitudes, values, judgments, axioms, opinions, guiding images, ideology, perceptions, conceptions, conceptual systems, dispositions, implicit theories, explicit theories, personal theories, personal practical knowledge, and perspectives. Twenty years later, Fives and Buehl (2012) stated that "the lack of cohesion and clear definitions has limited the explanatory and predictive potential of teachers' beliefs" (p. 471).

A brief review provides examples of the multitude of terms used to study teachers' beliefs. In 1981, Elbaz coined the term *practical knowledge* to describe teachers' rules of practice, practical principles, and images that guide their actions. Elbaz (1981) also identified five sources of teachers' practical knowledge: teachers' situational, personal, social, experiential, and theoretical beliefs. In 1986, Clark and Peterson called for studying teachers' thinking, including their decision making and beliefs. At that time, teachers' beliefs were assumed to be a subset of teacher cognition. Concurrently, Shulman (1986) suggested that beliefs were a "missing paradigm" in the research on teaching, and Kagan (1992) said teachers' beliefs were "at the very heart of teaching" (p. 85).

Research on teachers' beliefs in the 1980s focused on what researchers alternatively labeled as teachers' practical knowledge (Clandinin, 1986; Elbaz, 1981, 1983), or practical theories (Fenstermacher, 1986; Sanders & McCutcheon, 1986), and the relationship between teachers' beliefs and actions (e.g., Clandinin, 1986; Elbaz, 1983).

Researchers coined different terms to describe analogous interactions between knowledge, beliefs, and practices. For example, terms used in studies of teachers' beliefs included: personal practical knowledge (Clandinin, 1986; Connelly & Clandinin, 1985), practical arguments and practical reasoning (Fenstermacher, 1986), practical theory (Sanders & McCutcheon, 1986), practical philosophy (Goodman, 1988), theory of action (Marland & Osborne, 1990), schema (Bullough & Knowles, 1991), and personal practical theories (Cornett, 1990; Cornett, Yeotis & Terwilliger, 1990).

In the 1990s, Pajares (1992), Calderhead (1996), and Richardson (1996) clarified the differences between knowledge and beliefs and suggested that beliefs were more personal, whereas knowledge was based on facts agreed upon by members of particular communities. However, according to Kagan (1992), much of what had been considered professional knowledge should be categorized as beliefs, and Pajares (1992) concluded that attitudes, values, perceptions, theories, and images about teaching were just beliefs in disguise. Unfortunately, Pajares's (1992) attempt to clear up the messiness of studying teachers' beliefs persists (e.g., Fang, 1996; Fives & Buehl, 2012), perhaps because of the complex nature of teachers' beliefs.

More current research acknowledges that teachers' beliefs and teacher knowledge are closely related, especially the practical knowledge that guides their behaviors. Researchers have recognized that beliefs tend to be subjective and personal, and reflect individual judgment and interpretation of a community's agreed upon knowledge (Lundeberg & Levin, 2003; Richardson, 1996, 2003). Researchers also recognized that teachers' beliefs, including their pedagogical, epistemological, and self-efficacy beliefs, contribute to a system of beliefs and function as: filters for interpreting their experiences, frames for addressing problems they encounter, and guides for actions they take (e.g., Fives & Buehl, 2012). In addition, scholarship about teachers' professional identity development emphasized that beliefs are influenced by the social, cultural, political and historical contexts teachers experience during their careers (e.g., Beijaard, 1995; Beijaard, Meijer & Verloop, 2004; Fairbanks et al., 2010).

DEVELOPMENT OF TEACHERS' BELIEFS

Despite the profusion of terms in the literature about teachers' beliefs, empirical research provides evidence that beliefs influence teachers' judgments and actions in the classroom (e.g., Chant, 2002, 2009; Chant, Heafner & Bennett, 2004; Clandinin, 1986; He & Levin, 2008; Levin, He & Allen, 2013). Consequently, if teachers' beliefs influence their teaching, and therefore their students opportunities to learn, then beliefs should be a central concern of teaching and teacher education (Ammon & Levin, 1993; Kagan, 1992; Shulman, 1986).

However, there is not much research focused explicitly on the development of teachers' beliefs. Arguably, such research requires longitudinal studies that follow teachers into, through, and beyond their teacher education program because developmental shifts in teachers' thinking take a long time (Ammon & Levin, 1993; Levin, 2003). Longitudinal research is also needed because changes in teachers' beliefs may be temporary (Schraw & Sinatra, 2004) and situational (Buehl & Fives, 2012; Chant, 2002, 2009; Levin et al., 2013) rather than reflect actual developmental changes. Furthermore, different kinds of beliefs may change or develop differently, although this is an empirical question yet to be studied.

Reasons for Studying the Development of Teachers' Beliefs

The prior beliefs preservice teacher candidates bring with them into their teacher preparation programs serve as filters for interpreting new knowledge and new experiences (e.g., Fives & Buehl, 2008, 2012; Kagan, 1992; Lortie, 1975; Pajares, 1992; Richardson, 1996, 2003); therefore, teacher educators should know what those beliefs are (Murphy, Delli & Edwards, 2004). Without such knowledge, teacher education programs may have little influence on preservice teacher candidates because they do not have enough information to address their misconceptions, naïve theories, and strongly held prior beliefs (Lortie, 1975). Further, knowing teachers' beliefs better positions educators to help teachers develop the knowledge, skills, and dispositions they need to be successful in today's classrooms (Conway & Clark, 2003; Fives & Buehl, 2008; Watzke, 2007).

Understanding the content and sources of teachers' beliefs is essential for mentors, school administrators, and those who offer professional development for teachers because teachers' beliefs guide decisions they make and influence their subsequent judgments and actions in classrooms (e.g., Chant, 2002, 2009; Chant et al., 2004; Clandinin & Connelly, 1987; Elbaz, 1981; Kagan, 1992; Levin, He & Allen, 2010; Levin, et al., 2013). For example, educators and researchers often wonder why reform initiatives are not taken up or enacted with fidelity by every teacher. One reason may be that beliefs held by teachers influence how and why they may or may not change their practice to incorporate new curriculum, adopt new instructional strategies, or take up new initiatives. Research on reform-based mathematics education, science education, and technology integration reinforces a need to study the development of teachers' beliefs because of teachers' resistance to reform-based practices (e.g., Ambrose, 2004; Bray, 2011; Ertmer & Ottenbreit-Leftwich, 2010; Vacc & Bright, 1999; Windschitl & Sahl, 2002). Understanding the beliefs that guide teachers' decision making and actions in their classrooms could help educators at all levels adjust how they work with teachers to provide more targeted feedback to support teachers' professional growth and development throughout their career.

Characteristics Affecting Belief Development

While beliefs, and the sources of those beliefs, held by individual teachers are unique and personal, beliefs can be aggregated and categorized to determine patterns or clusters of beliefs that may be held in common by groups such as preservice, novice, and experienced teachers. This section focuses on research about the sources of teachers' pedagogical beliefs, and other factors that influence belief development, including the situated nature and stability of teachers' beliefs. Most of these studies are based on beliefs aggregated across groups of teachers, rather than those of individual teachers.

Sources of teachers' beliefs. The sources of teachers' beliefs may have an influence on whether or not beliefs are changeable and how they develop over time; therefore, identifying the sources of teachers' beliefs is an important aspect of studying belief development. The source of teachers' beliefs about what counts as knowledge for teaching stems from both external sources, such as formalized knowledge (Shulman, 1986), and more internal sources, such as personal experiences (Richardson, 1996). Research

on teachers' concerns (Conway & Clark, 2003; Watzke, 2007), while not included in the list of synonyms for beliefs, also noted the influence of internal and external sources of their concerns. Buehl and Fives (2009) identified six sources for teachers' epistemological beliefs about knowledge for teaching: formal education, formal bodies of knowledge, observational learning, collaboration with others, personal teaching experiences, and self-reflection. These findings include both external and internal sources of knowledge for teaching, which matches the results of studies by Levin and her colleagues (Levin & He, 2008; Levin et al., 2010, 2013) described next.

Levin and He (2008) found that 84 preservice teachers attributed the source of their pedagogical beliefs fairly evenly across three sources: (a) their family background and personal experiences as K-12 students (35%); (b) their teacher education coursework including exposure to various readings, theories, and professors' ideas (31%); and (c) their experiences observing and practicing in classrooms during their teacher education program (35%). In a follow-up study of 22 inservice teachers from the original pool of 84 preservice teachers, Levin and her colleagues (Levin et al., 2013) found that inservice teachers with one to six years of teaching experience attributed their pedagogical beliefs to (a) what they learned during their teacher education program (28%); (b) their family values and experiences as K-12 students (27%); (c) their own teaching experiences (24%); (d) recent professional development, readings, and videos (12%); and (e) observations of other teachers (8%). Although these studies revealed sources for the pedagogical beliefs of both preservice and inservice teachers, how or why some beliefs might be more changeable than others remains an area for further research. In addition, more research is needed to study connections between sources of teachers' beliefs and the development of teachers' beliefs.

The role of context and situativity. Situativity, in the context of studying teachers' beliefs, means that knowledge about teaching and learning is influenced by contextual factors (see Skott, Chapter 2, this volume). In fact, attending to context is paramount to understanding the development of beliefs because teachers' beliefs and actions cannot be separated from situations in which they occur; including the larger social, political, and economic climate as well as the immediate school context. Several studies have found that differences and changes in teaching contexts influence beliefs, especially with regard to enacting one's beliefs in practice (Chant, 2002, 2009; Levin et al., 2013). For example, Chant (2002) conducted case studies of three preservice teachers he followed into their first teaching positions to document changes in their pedagogical beliefs, which were influenced by their interpretation of their experiences as beginning teachers in different school contexts with different school cultures. For example, one teacher Chant (2002) followed was unable to put all her stated beliefs into action, which was an outcome she attributed to her new teaching context that was very challenging, not a good match to the supportive and collaborative context of earlier teaching experiences, and lacking adequate resources.

In a comparative study, He and Levin (2008) elicited beliefs from preservice teachers, their (experienced) cooperating teachers, and their university-based teacher educators (also experienced, retired teachers). Findings indicated that the content and sources of pedagogical beliefs among these three groups were similar; however, the scope of how they described their beliefs differed based on their roles and the context in which they operated. In this study, the beliefs of the preservice teachers

were focused on their roles *in the classroom* and the importance of building relationships with individual students, while their experienced cooperating teachers also emphasized beliefs about relationships but described relationships as the learning communities they established *both in their classrooms and in their school*. University-based teacher educators also expressed beliefs about the importance of relationship building, but they included sociocultural factors that influence relationships *beyond the classroom and school setting*. In sum, differences in the beliefs of these three groups of teachers appeared to be connected to their situational context and positionality, including their differing roles, teaching contexts, and years of teaching experience (He & Levin, 2008).

Another way to think about situativity is to compare beliefs of teachers from different countries around the world. For example, McMullen et al. (2005) used surveys to compare beliefs and practices of early childhood teachers in China, Taiwan, Korea, and Turkey. They found similarities in beliefs and teaching practices among early childhood educators about curriculum integration, the social/emotional development of young children, use of manipulatives to promote hands-on learning, encouraging play, and the importance of following children's choices as a guide for the curriculum. In another survey, Shin and Koh (2007) compared beliefs of urban secondary teachers in Korea and the United States regarding classroom management. They found statistically significant cross-cultural differences in teachers' instructional and management styles, although there were no differences in teachers' beliefs about classroom management based on years of teaching experience. He, Levin, and Li (2011) compared the pedagogical beliefs of Chinese and American preservice teachers using open-ended survey questions derived from a prior study (see Levin & He, 2008). This study highlighted the impact of traditional Chinese culture on Chinese teachers' beliefs and the importance of taking cultural context into consideration when examining teachers' pedagogical beliefs by comparing the content and sources of pedagogical beliefs of 106 preservice teachers from two teacher education programs in China and the United States.

Buehl and Fives (2012) concluded that beliefs which are "activated or espoused may depend on the context" (p. 475). Relatedly, Levin et al. (2013) found that expectations within the teaching context affected how teachers' beliefs about differentiation were enacted in the classroom. In this study teachers' beliefs about differentiation were not enacted fully due to ability grouping required in their school, and because no further differentiation was expected within those groups by the school's administrators. Overall, the research on teachers' beliefs, including comparative and cross-cultural studies, highlights the contextual and situated nature of teachers' beliefs as factors that can influence both the development and enactment of teachers' beliefs.

Stability of Beliefs. Research by Buehl and Fives (2009) and others (Olafson & Schraw, 2006; Schraw & Olfason, 2002; Schraw & Sinatra, 2004) about the stability of teachers' epistemological beliefs highlighted the changing nature of teachers' beliefs about the sources of knowledge for teaching. Schraw and Olafson (2002) concluded epistemological beliefs do not change quickly or easily; and Schraw later claimed "[t]here has been little research on teachers' personal epistemologies, how these beliefs develop, are affected by teacher education, or how teachers' beliefs affect the development of students' beliefs" (Schraw & Sinatra, 2004, p. 100). Schraw and his colleagues called for longitudinal research to study how teachers' epistemological

beliefs change over time, and they concluded that teachers' epistemological beliefs were not always consistent with how they taught, that teachers held different epistemological beliefs simultaneously, and that teachers' epistemological beliefs included both general and domain-specific ideas about what counts as knowledge for teaching (Olafson & Schraw, 2006). These studies revealed that teachers hold a variety of epistemological beliefs about different content areas, which is related to whether teachers believe knowledge is fixed or changeable, and therefore relevant to understanding if and how teachers' beliefs develop over time.

Other researchers have found that both teachers' concerns and pedagogical beliefs can and do change over time (e.g., Alger, 2009; Chant, 2002, 2009; Chant et al., 2004; Conway & Clark, 2003; LaParo, Siepak & Scott-Little, 2009; Watzke, 2007). However, still other researchers found teachers' beliefs resistant (Kagan, 1992; Wideen, Mayer-Smith & Moon, 1998) or difficult to change (e.g., Putnam & Borko, 1997; Richardson, 1996, 2003). Buehl and Fives (2009) found that teachers expected their understanding of teaching to change, while others found beliefs may be changeable if teachers are aware of how beliefs influence their practices (Chant, 2002, 2009; Nesper, 1987), and that teachers' beliefs changed and developed as they gained more teaching experience (Chant et al., 2004; Fives & Buehl, 2008; Levin et al., 2010, 2013; Luft & Roehrig, 2007).

In one example, LaParo et al. (2009) compared the pedagogical beliefs of preservice teachers at the beginning and end of a four-year early childhood education program to those of their faculty mentors. They found that by the end of their program preservice teachers held beliefs similar to those held by their faculty mentors about classroom practices, behavior management, and especially about children and their development. They also found that the preservice teachers' beliefs did not change during the few months of their final student teaching semester. Based on research to date, it seems safe to conclude that the question of whether teachers' beliefs are changeable does not have a definitive answer, and we need further research about: (a) if, how, when, and why changes occur in teachers' beliefs over time; (b) whether or not such changes are observable in teachers' classroom practices; and (c) what the catalysts for change and/or development may be. Research that has focused on these aspects of belief development are described in the remainder of this chapter.

RESEARCH USING PERSONAL PRACTICAL THEORIES (PPTs)

Defining PPTs

As can be seen throughout this handbook, researchers have used qualitative, quantitative, and mixed methods to study teachers' beliefs, including surveys, Q-sorts, narratives, biographies, life history, metaphors, case studies, etc. Most research on epistemological and self-efficacy beliefs has been based on survey data. Researchers focused on teachers' pedagogical beliefs typically asked teachers what guided their thinking about teachers and teaching, curriculum, and student learning, and then interpreted their pedagogical beliefs from what teachers said they do or intended to do in the classroom. Sometimes they observed what they were actually doing in their classrooms to look for the enactment of previously expressed beliefs (Levin et al., 2010, 2013). Because teachers act on beliefs that are often implicit and unexamined,

several researchers have shown beliefs can be elicited through the personal theorizing process, which is described next.

Levin and her colleagues completed a series of studies designed to uncover the content and sources of teachers' beliefs with the ultimate goal of understanding if and how teachers' beliefs develop over time (He & Levin, 2008; He et al., 2011; Levin & He, 2008; Levin et al., 2010, 2013). Following earlier studies using the personal theorizing process to reveal teachers' beliefs (e.g., Chant, 2002, 2009; Chant et al., 2004; Cornett, 1990; Cornett et al., 1990), they used a process to elicit teachers' beliefs called teachers' personal practical theories, or PPTs. Following Cornett (1990, p. 251), Levin defined PPTs as teachers' *beliefs that guide classroom practices (theories) based on prior life experiences, including non-teaching activities (personal), and experiences that occur as a result of designing and teaching the curriculum (practical)* (Levin & He, 2008, p. 56).

The use of PPTs as a proxy of teachers' beliefs was used during these studies because it appropriately highlighted reflection on the theory-practice connection important to both teacher education and teacher development. That is, the personal theorizing process helped teachers think about and articulate their tacit beliefs and make them explicit, either orally or in writing. This process also allowed teachers to choose what they wanted to reveal about their beliefs in their own words. As a result of this highly reflective personal theorizing process, teachers' beliefs were made available for examination by researchers and the teacher educators who engaged them in this process. In studies by Levin and her colleagues, the personal theorizing process yielded teachers' pedagogical beliefs, which was likely due to how PPTs were defined and the examples provided in the context of data collection.

How the Personal Theorizing Process Works

The personal theorizing process has three steps. The first step asked teachers to discuss a presentation that defined PPTs and presented several examples of different teachers' PPTs. In studies with preservice teachers (Levin & He, 2008; Levin et al., 2010, 2013), they also read an article about PPTs (Cornett, 1990). After the presentation, teachers were asked to reflect on and list their personal beliefs and to describe them in detail, including how they saw each of their beliefs looking and sounding in practice in the classroom. Next they were asked to identify the source(s) of each of their PPTs and were told that there may be more than one source for each PPT. Preservice teachers were also asked to create a graphic image, either by hand or using a computer, to represent any connections among their PPTs in a visual manner. This process typically yielded between four and seven belief statements and 5–10 pages of detailed explanation per participant. In studies that included experienced inservice teachers (He & Levin, 2008; Levin et al., 2010, 2013), only this first phase of the personal theorizing process was used to elicit their PPTs, sources of PPTs, and a description of how teachers enacted their PPTs in their classrooms during an audio-recorded interview, rather than in writing, to respect their time.

The second stage of the personal theorizing process included data gathering and self-analysis so teachers could evaluate whether they felt they had good evidence of actually enacting their PPTs in their teaching. Specifically, teachers were asked to provide evidence of whether they had carried out their PPTs in the pre-active stage

of teaching (such as when planning lessons), during the active stage, which might be evidenced in observation feedback by supervisors, and in the post-active stage (such as in written reflections about teaching experiences). This part of the personal theorizing process was undertaken with preservice teachers in studies conducted by Levin and her colleagues, although Chant (2002, 2009) and others (e.g., Cornett, 1990) also used the second stage of the personal theorizing process with inservice teachers.

The third and final stage of the personal theorizing process required teachers to plan and carry out an action research study related to one of their PPTs. In this stage, both preservice and inservice teachers were asked to find both empirical research and practical information related to one of their PPTs (Chant, 2009; Chant et al., 2004; Cornett, 1990; Levin & He, 2008). It was suggested they choose a PPT for which they did not have good evidence of enacting but still believed in strongly, or a PPT they really wanted to learn more about so they could better enact it in their classroom. This research informed their action research plan, which inservice teachers carried out in their classrooms and preservice teachers carried out during student teaching. The studies described below used data only from the first stage of the personal theorizing process.

Summary of Research Based on Teachers' PPTs

In the initial PPT study conducted by Levin and He (2008), which used the entire personal theorizing process described above, PPTs were collected over the course of three years. For this study the researchers analyzed a total of 472 self-reported PPTs from 84 preservice teacher candidates to try to understand the content and sources of these preservice teachers' beliefs, expressed as their PPTs. These data were collected prior to student teaching, although the participants had at least 150 hours of field experiences before they wrote about their PPTs. Findings indicated that the PPTs of these preservice teacher candidates were (1) based on personal experiences both as K-12 students and their practical experiences and observations in classrooms during their teacher preparation program, (2) became their guiding theories for how to teach, (3) were primarily focused on pedagogy (e.g., what to do in the classroom and how to do it), (4) were influenced by the teaching contexts they experienced, (5) were used to guide their classroom decision making during their preservice field experiences, and (6) provided the foundation of their reasons for acting as they did in their field experiences. In categorizing all 472 PPT belief statements, four major content categories encompassed their beliefs about *Teachers*, *Instruction*, *Classrooms*, and *Students*. This study helped to develop a framework for categorizing the content and sources of the PPTs that was used in subsequent studies (Levin & He, 2008).

The second study of teachers' beliefs based on their PPTs, which was described earlier in this chapter, compared preservice teachers, their cooperating teachers, and their university supervisors (He & Levin, 2008). The purpose of this study was to see if there were matches or mismatches among the beliefs of people who worked together in the same teacher education program. The content and sources of a total of 177 PPT statements were collected from 41 participants: 23 preservice teacher candidates, 8 cooperating teachers, and 10 university supervisors. Findings indicated clear matches in the content of the beliefs these three groups of teachers held

about *Teachers, Instruction, Classrooms, Students, Teaching and Learning, and Parents*. However, the scope or perspective of their PPTs differed regarding how these three groups of teachers described the content of their similarly-categorized pedagogical beliefs. That is, beliefs expressed by preservice teachers were focused mainly on their relationships with individual students in the classroom, while cooperating teachers' beliefs were focused on relationships in the classroom and school as a whole, and university supervisors' beliefs included sociocultural influences from the community outside the school on relationships.

The third study based on teachers' PPTs was a cross-cultural comparison study of preservice teachers in China and the United States (He et al., 2011), which was briefly described earlier. In this study the PPT process was modified to collect data using open-ended survey questions based on categories of PPTs uncovered in two earlier studies (He & Levin, 2008; Levin & He, 2008). A survey was deemed a more culturally sensitive approach to research with preservice teachers in China because they were not usually asked to openly express their beliefs. Therefore, 53 US and 53 Chinese preservice teachers responded to 14 questions pertaining to beliefs about teachers, teaching, classrooms, students, and teaching and learning. They also indicated their primary and secondary sources for each belief and were invited to make clarifying comments about any question if they desired, or to refrain from answering any question they did not feel was pertinent to their beliefs. Surveys were completed anonymously during one class period both in the United States and China after a presentation about PPTs as expressions of one's pedagogical beliefs translated into their native language. Analysis of the survey data revealed both similarities and difference in beliefs held by these two groups of preservice teachers, as well as clear evidence of cultural and contextual influences on the content of the beliefs of both groups.

A fourth study by Levin and her colleagues (Levin et al., 2010, 2013) was a cross-sectional, longitudinal follow up of study of a subset of participants from the initial study by Levin and He (2008). The goal of this study was to see if PPTs changed over time, how they changed, and what influenced any changes in PPTs. Twenty-two teachers who had one to six years of classroom teaching experience and had completed the personal theorizing process as preservice teachers were recruited for interviews about their current PPTs and their teaching was observed. The pedagogical beliefs of these teachers changed with regard to both the number and content of PPTs they expressed based on their years of teaching experience. That is, teachers with six years of experience expressed fewer PPTs compared to those with four years of experience who expressed fewer PPTs than those with one or two years of experience. While all participants said they still held their initial beliefs, those with more experience stated that many of their early beliefs had become ingrained in who they are and how they teach. They said they did not feel the need to express some of their initial beliefs because that was just who they were as teachers. In sum, this study revealed that PPTs can and do change over time, and also that their beliefs do change when the context changes to either support or not support certain PPTs, as described next.

The classroom observation data from the same cross-sectional, longitudinal follow-up study by Levin and colleagues (2013) also revealed that expectations within the teaching context for three teachers who taught their entire careers in the same

school, including student teaching, affected how their beliefs about differentiation were enacted. In this school, students were ability grouped for reading and math with no expectation for differentiation within those ability groups. As a result, PPTs about differentiation were not enacted, which was an unintended consequence of the schools ability-grouping policy and an example of the influence of context on teachers' beliefs. Chant (2002, 2009) also found the beliefs of the teachers he followed longitudinally were influenced by their changing context as they gained experience and moved to different schools. These studies, and others (e.g., Beijaard, 1995; Beijaard et al., 2004) revealed how the nature of teachers' beliefs were affected by both their situational context and experience.

Findings Across PPT Studies

Although most studies about teachers' beliefs indicate if participants are preservice teachers, novices still in their induction years, or experienced teachers, there is little research comparing these groups in order to distinguish differences (for exceptions see Buehl & Fives, 2008; He & Levin, 2008; Levin et al., 2010, 2013; Murphy et al., 2004). Arguably, research on the beliefs of teachers with different years of experience is one way to see developmental differences in beliefs; although only one of the studies cited in this chapter (Levin et al., 2010, 2013) followed a subset of the same teachers so their beliefs could be compared over time. What is known about pedagogical beliefs of preservice, novice, and experienced teachers is summarized next.

Preservice teachers' beliefs. Research on preservice teachers' beliefs clearly shows their prior beliefs serve as a filter for what they learn (Clandinin & Connelly, 1987; Elbaz, 1981; Kagan, 1992; Richardson, 1996, 2003). More specifically, the content of preservice teachers' beliefs elicited in studies using the personal theorizing process (e.g., He & Levin, 2008; He et al., 2011; Levin & He, 2008; Levin et al., 2010, 2013) included pedagogical beliefs about teachers (qualities of good teachers, roles and responsibilities); teaching and learning (goals, instructional practices, assessment); the classroom (environment, management); and students (relationships, how learning happens). However, the percentages of pedagogical beliefs expressed by preservice teachers in the first PPT study by Levin and He (2008) were unevenly distributed across these four categories. That is, only 8% of the PPTs of these preservice teachers were about students; whereas, 28% of their beliefs were about the teacher, 29% were about the classroom, and 35% were about instruction. Given the timing of this study, which was completed before student teaching, these findings were not surprising, even given research about the concerns of preservice teachers (Conway & Clark, 2003; Watzke, 2007). Other studies about preservice teachers' beliefs can be found throughout this handbook, including the chapters in Section V that focus on teachers' beliefs about knowing and teaching in different academic domains.

Novice teachers' beliefs. Compared to studies of preservice teachers' beliefs, the beliefs of novice teachers have not been well articulated in the research literature. However, in the Levin et al. (2013) study, novice teachers with one or two years of experience did not change the pedagogical beliefs they held when they were preservice teachers, while those with five and six years of experience said that many of their original PPTs expressed as preservice teachers were "ingrained" and "just the

way I teach,” which was interpreted as evidence for developmental changes in these teachers’ beliefs. The novice teachers in the Levin et al. (2013) study also expressed more pedagogical beliefs (5–8 PPTs) compared to teachers with six years of experience (2 PPTs). The authors speculated that this may have been because pedagogical beliefs acted as goals for teachers in this study and novice teachers had many more beliefs they had yet to achieve compared to more experienced teachers. Conversely, experienced teachers had more time to enact their beliefs in their practice, so they expressed fewer PPTs as goals left to accomplish. Expressing fewer beliefs, and thinking of beliefs as goals yet to be accomplished, may be a developmental shift in how teachers think about their beliefs, but this conjecture warrants longitudinal research with more teachers.

Experienced teachers’ beliefs. For experienced teachers, research tells us that their beliefs change based on their context, years of experience, and knowledge about their content (e.g., Beijaard, 1995; Beijaard, et al., 2004; Chant, 2002, 2009; Ertmer, 2005; Ertmer & Ottenbreit-Leftwich, 2010; Levin, et al., 2010, 2013). Pedagogical beliefs expressed by more experienced teachers included beliefs about their classrooms (structures and management), instructional strategies (student-centered and differentiated), their students (expectations), and themselves as teachers (professionalism), which indicated a shift away from beliefs about themselves to beliefs about their students’ needs (He & Levin, 2008; Levin et al., 2010, 2013). Comparing the percentage of beliefs expressed by 84 preservice to a subset of 22 of these same teachers 4–6 years later, Levin et al. (2010) reported that the percentage of beliefs expressed experienced teachers’ were about differentiation (18%) and student-centered instruction (18%) compared to 8% and 6% of the preservice teachers’ beliefs. In addition, 10% of the experienced teachers’ beliefs were about having high expectations for students versus 5% of the preservice teachers’ beliefs, and 16% versus 8% were about being professional. Thus, Levin et al. (2010) described a shift away from more teacher-centered PPTs among less experienced teachers toward more student-focused PPTs expressed by more experienced teachers. One example was a shift from the importance of building relationships with students to beliefs about having specific, high expectations for students. Other studies of teachers’ beliefs, especially those related to beliefs about teaching math and science and technology, also indicated that teachers’ beliefs may become more student-centered over time (e.g., Luft & Roehrig, 2007; Murphy et al., 2004; Sandholtz, Ringstaff & Dwyer, 1997), especially with regard to their epistemological beliefs. Nevertheless, more research, especially longitudinal research, is needed to confirm whether this observation of more student-centered beliefs expressed by experienced teachers is a developmental pattern.

In addition, current trends in research about teachers’ epistemological and pedagogical beliefs indicates that teachers’ beliefs are complex, seem to be influenced by teachers’ views of knowledge as fixed or changeable, may differ with regard to different knowledge domains, and are likely to be influenced by uncertainty as well as by external constraints (e.g., Buehl & Fives, 2009; Fives & Buehl, 2008; Luft & Roehrig, 2007; Olafson & Schraw, 2006; Schraw & Olafson, 2002). However, because there is research that says beliefs are not changeable, and other research that indicates that beliefs are changeable, a closer look at strengths and weaknesses inherent in research on teachers’ beliefs is warranted.

STRENGTHS AND WEAKNESSES IN STUDIES OF BELIEF DEVELOPMENT

Unfortunately, there are very few longitudinal studies of teachers' pedagogical, epistemological, or self-efficacy beliefs. There are even fewer longitudinal studies about how other kinds of beliefs influence teachers' practice (e.g., moral, ethical, and various beliefs about societal issues). Therefore, any claims about the development of teachers' beliefs should be considered carefully with regard to both the timeframe of the research and types of beliefs being studied.

Some studies of teachers' beliefs claim to be longitudinal but only follow teachers from the beginning to the end of their teacher preparation program, or only into their first year of teaching. Such research may be reporting short-term changes in beliefs rather than actual developmental shifts. To begin studying the development of teachers' pedagogical beliefs, Levin and her colleagues conducted a cross-sectional, longitudinal study of teachers with one to six years of teaching experience (Levin et al., 2010, 2013), but there are no truly longitudinal studies about teachers' beliefs that follow a group of teachers throughout their career.

Strengths

Nevertheless, among the strengths of the research on teachers' beliefs is a persistent interest in better understanding different types of beliefs, the connection among teachers' beliefs and practices, factors that influence the development of beliefs, and whether and how beliefs change or develop. Researchers interested in beliefs also understand the complexity and interaction of teachers' knowledge and beliefs and they are concerned about using effective research methods (see Section II, this volume, for more about methodology and assessment of teachers' beliefs).

Further, using the personal theorizing process as described earlier may serve to strengthen research because it helps researchers uncover and make teachers' beliefs explicit and available for study using their own words. This process also provides researchers a baseline for seeing if teachers enact their beliefs in practice. The personal theorizing process also benefits teachers by increasing their self-knowledge, which theoretically should support them in developing metacognitive thinking about teaching and learning and a sense of agency (Fairbanks et al., 2010; Levin, 2003).

Because researchers have seen the role that context and different domains of knowledge play in defining and understanding beliefs, they recognize the importance of being explicit about naming specific types of beliefs being studied. Using both qualitative and quantitative research methods is also a strength when studying teachers' beliefs, as is using constructed mixed methods studies (e.g., He & Levin, 2008). Nevertheless, research on the development of teachers' beliefs is limited in several ways that underscore the messiness of studying teachers' beliefs (Pajares, 1992).

Weaknesses

First, the proliferation of terms used in studies of beliefs makes it hard to compare results. Not all research on teachers' beliefs clearly label the type of belief(s) being studied and different kinds of beliefs are often conflated in discussions of research on teachers' beliefs.

Second, different contexts in which studies of teachers' beliefs occur, including studies of teachers with different years of experience, also limit our understanding of the full scope of teachers' beliefs, including how they develop.

Third, and maybe most problematic is that most research on teachers' beliefs consists of small-scale case studies (typically of one to four teachers). Lack of generalizability and threats to the validity of small-scale qualitative case studies are weaknesses; plus, belief data are typically self-report data. These weaknesses affect the entire field of research on beliefs, no matter what method is used to collect data from teachers about their beliefs.

Fourth, research on preservice teachers' beliefs has most often been collected using surveys, especially when assessing epistemological, self-efficacy, and moral beliefs. Surveys do not always capture nuances, reasons for, or the sources of teachers' beliefs unless researchers ask open-ended questions to solicit further explanation in teachers' own words. Also, surveys limit our understanding of the development of teachers' beliefs unless follow-up studies are undertaken so the same teachers respond multiple times during their careers to surveys about their beliefs. In contrast, the content and sources of teachers' beliefs, expressed as PPTs, may be elicited in detail by using the personal theorizing process; however, this is also self-reported data. Conducting follow-up observations and follow-up interviews with teachers over time may help confirm whether espoused beliefs are actually enacted in teachers' practices, but such research is time-consuming.

Fifth, the dearth of longitudinal research on teachers' beliefs described earlier makes it difficult to determine if changes in teachers' beliefs are mainly situational or if there is a real developmental shift in teachers' beliefs over time; therefore, longitudinal studies of teachers' beliefs are needed. Following teacher education program graduates over time to learn how their beliefs are influenced by changing teaching contexts is also essential when studying the development of beliefs. The cross-sectional longitudinal study by Levin et al. (2010, 2013) is one example of how to study connections between teachers' pedagogical beliefs and their practices over time; however, such studies need to be replicated and more ways to study the development of teachers' beliefs are needed to find out what triggers the development of teachers' beliefs and whether developmental shifts or patterns can be predicted or supported in some way.

Sixth, there is a lack of diversity among participants in research on teachers' beliefs with regard to gender, age, race, ethnicity, language background, and socio-economic status. The fact that the majority of teachers are female, white, monolingual, and middle class explains this issue. Nevertheless, lack of attention to diversity remains a weakness that impedes a fuller understanding of the beliefs of all kinds of teachers. For example, we have few studies about beliefs of teachers who enter teaching through alternative pathways, and none that purposefully compare beliefs of male and female teachers, or teachers of color with white teachers, or teachers in urban school with those in other types of schools. Attention to diversity in studies of teachers' beliefs would benefit from more comparative and cross-cultural studies to elucidate how contextual and cultural factors may influence teachers' beliefs.

A final weakness in the research on teachers' beliefs is the lack of clearly articulated theoretical or conceptual frameworks undergirding most studies of teachers' beliefs. Fortunately other chapters in this handbook address many of these weaknesses and discuss methodology issues about research on teachers' beliefs in more depth.

RECOMMENDATIONS

Teacher Educators

During challenging times when teacher attrition remains high, it is incumbent upon teacher educators to prepare teachers who can sustain themselves when competing expectations challenge their beliefs. Studying the content, sources, and development of teachers' beliefs could help teacher educators better understand what preservice teacher candidates bring into their teacher preparation program, and what they take from it. If teacher educators expect to influence teachers in their classes, they must help teachers make their beliefs explicit because beliefs serve as filters, frames, and guides to what is learned (Fives & Buehl, 2012). Seeking such understanding also may help administrators who hire teachers, as well as induction support and professional development staff, better support teachers as they develop and enact both their strongly held beliefs and those a teacher education program, school, or district espouses. The complex and situated nature of beliefs will always make this a messy enterprise, but there is evidence teachers' concerns and their epistemological and pedagogical beliefs can and do change (e.g., Alger, 2009; Chant, 2002, 2009; Chant et al., 2004; Conway & Clark, 2003; Fives & Buehl, 2008; LaParo et al., 2009; Levin et al., 2010, 2013; Luft & Roehrig, 2007; Watzke, 2007).

If teacher educators can help beginning and experienced teachers become conscious about how their beliefs influence their practice, and also help them develop metacognitive awareness of their beliefs and practices in action, then maybe this process will help them continue to develop as teachers across their careers (Fairbanks et al., 2010; Levin, 2003). Teachers cite their beliefs as part of their rationale for decisions they make. Without articulating, reflecting, and acting on one's beliefs, it is too easy for teachers (and teacher educators as well) to be influenced by the ever-changing political and policy climate experienced during a career (Fairbanks et al., 2010; Levin et al., 2010, 2013). Further, when teachers and teacher educators know what they believe, value, and are working to accomplish, then they are better positioned to lead in their classrooms and schools; justify the reasons behind their practices with peers, administrators, and parents; and question mandates or policies that run counter to what they believe is best for children in significant and socially just ways. In addition, when teachers are able to articulate and connect their beliefs and practices, they are better able to mentor others, share their perspectives with university-based teacher educators, and provide examples of how practice can inform theory.

Researchers

Researchers interested in studying teachers' beliefs must be explicit about the kinds of beliefs being studied. Although challenging, it would be ideal to study all types of beliefs teachers hold simultaneously because many beliefs influence teachers' actions in their classrooms. However, we first need to be clearer about ways to study how specific kinds of teachers' beliefs develop over time.

Clearly there is a pressing need for researchers to conduct longitudinal research that follows teachers for extended periods of time to confirm if and how their beliefs change, develop, and get enacted in classrooms. However, following teachers

through their teacher education, or only into their first year teaching, is not enough to understand how teachers' beliefs develop throughout their career (Levin, 2003).

Previous research on teachers' beliefs also suggests using appropriate methodologies for studying different kinds of beliefs. Neither single case studies nor one-time surveys are robust enough to further our understanding of the development of teachers' beliefs. Instead, multiple case studies of teachers' beliefs of all kinds, including collaborative studies asking the same research questions in many different settings would be helpful. Another suggestion is to use mixed methods research designs. For example, it would be useful to conduct multiple, large-scale surveys with the same teachers over time followed by multiple observations and case studies of teachers in the field (Fang, 1996). Therefore, sequential explanatory mixed methods studies about teachers' beliefs are recommended.

As mentioned above, whose beliefs we study is also an important consideration for researchers in order to better understand how diversity affects teachers' beliefs. Most research on teachers' beliefs to date has been about preservice teachers, largely because they are convenient for university-based researchers to access. And, while we do need more research about the beliefs of experienced teachers, there appears to be no research about teachers who enter the profession through alternative pathways, teachers who are not full-time teachers, and teachers who leave the profession early.

Related to diversity, it would be wise to study the beliefs of more and less experienced teachers of color, male teachers, and bilingual teachers to see if their beliefs, or the sources of their beliefs, differ from the white, female, monolingual majority of teachers (see Gay, Chapter 25, and Lucas, Villegas, and Martin, Chapter 26, of this volume). Given the changing demographics of today's student population, studying diverse groups of teachers might yield information that can be applied in other contexts. Also, because context and situativity influence teachers' beliefs in action, we should study ways beliefs of more and less experienced teachers in urban schools may differ from those in rural or suburban settings. These kinds of studies would increase our understanding of the situated nature of beliefs, and also offer opportunities to study the developmental trajectory of teachers' beliefs in these settings.

Finally, research about any connections between the development of metacognition in teachers and their beliefs would be of interest, as would determining if certain beliefs are more changeable than others. For example, I would predict that beliefs that have their source in a teacher's personal family or cultural background might be challenging, if not impossible to influence, but this is another empirical question that needs research.

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5

THE RELATIONSHIP BETWEEN TEACHERS' BELIEFS AND TEACHERS' PRACTICES

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For this chapter, we were tasked with discussing teachers' beliefs and teachers' practices. The importance of research on teachers' beliefs stems from the possible relationship between beliefs and practice (Calderhead, 1996; Pajares, 1992; Richardson, 1996; Woolfolk-Hoy, Davis, & Pape, 2006). However, there is evidence that teachers' espoused beliefs are not present in their enacted practices and that teachers engage in practices they indicate that they do not support (Lee, 2009; Liu, 2011). We argue that this lack of congruence is no reason to discount the power of beliefs. Instead, it is necessary to understand the potential relationship between beliefs and practice as well as the possible internal and external factors that may support or hinder this connection.

DEFINITIONS, METHODS, AND APPROACH TO THE CHAPTER

Teachers' beliefs have been defined in various ways by researchers with different emphases on the characteristics (e.g., implicit or explicit nature, stability, situated or generalized nature, relationship to knowledge) and function of beliefs (see Fives & Buehl, 2012). We adopt Pajares's (1992) definition of belief as "an individual's judgment of the truth or falsity of a proposition" (p. 316), and recognize that teachers possess beliefs about many different things (e.g., knowledge, students, and instruction) related to teaching, at varying levels of specificity. We also hold that some beliefs are explicit to the teacher whereas others are implicit but that all beliefs exist within a complex, interconnected, and multidimensional system. Within that multidimensional system, beliefs may be primary or derivative (i.e., grounded in primary beliefs), core or peripheral (i.e., endorsed with more or less conviction) and be held in clusters, that are more or less isolated, thereby allowing incompatible or inconsistent beliefs to coexist (Green, 1971). Although we believe there is some degree of plasticity to beliefs, such that they can change with time and/or experience, we hold

that beliefs are more or less stable or consistent within the individual. Additionally, in our view, teacher beliefs are held within the individual and are distinct from knowledge. That is, knowledge is externally verifiable (e.g., Green, 1971) whereas beliefs are subjective claims the individual accepts as being true (Nespor, 1987; Pajares, 1992). Finally, beliefs may serve different functions or roles in relation to teachers' knowledge and actions (Fives & Buehl, 2012). That is, beliefs may be used by teachers to (1) filter and interpret information, (2) frame a specific problem or task (e.g., lesson planning), and (3) guide immediate action.

Given the purpose of this chapter and its position within the volume, we take a broad approach to teachers' beliefs and report on a variety of beliefs. Many of these beliefs are addressed in more detail in other chapters in this volume, and we encourage the interested reader to follow up with additional reading. We conducted a broad literature search for articles in the ERIC and PsychInfo databases that contained the terms "teach* belief*" and "practice" in the article abstracts. Due to the abundance of work addressing teachers' beliefs, we limited the search to English peer-reviewed articles published between 2008 and 2012. Using these parameters, we identified 499 potential articles in ERIC and 283 in PsychInfo.

We reviewed the abstracts for duplicates across databases and eliminated works based on specific criteria. Specifically, included articles had to be data-based and assess and/or manipulate both the beliefs and practices of K-12 practicing or preservice educators. Articles that inferred teachers' beliefs from observed practice, reported on teachers' intended practices, or referred to beliefs or practices as possible explanations for findings, without actually assessing or manipulating them, were eliminated. For this chapter, we defined "practice" as any action that is part of the teaching process (e.g., planning, decision making, instructional strategies or approaches, assessment, reflection, work with families, and relationship building). We excluded studies addressing preschool educators (i.e., pre-kindergarten), other school personnel (e.g., administrators, librarians), or post-secondary educators, unless K-12 teachers were included in the study, and, in those cases, we focused primarily on results related to the K-12 teachers.

Through this process, we identified 257 articles in which a wide variety of beliefs and practices were assessed, reflective of the various belief topics addressed in this volume. Similar to the previous review by Fives and Buehl (2012), there was an emphasis on teachers' beliefs related to literacy, math, science, and technology as well as reform initiatives in these areas (e.g., inquiry learning and technology integration). Studies also addressed beliefs about assessment and accountability efforts and reforms as well as beliefs about students in general and specific subgroups of students (e.g., students with disabilities, English Language Learners, and at-risk students). The majority of these articles (i.e., 215; 84%) addressed the beliefs and practices of practicing teachers with 40 articles (i.e., 16%) addressing preservice teachers. However, simply categorizing participants as preservice or practicing teachers obscures important nuances. Preservice teachers were typically involved in student teaching or were sampled from teacher education courses with field placement experiences whereas practicing teachers were studied at various points in their careers (e.g., beginning teachers during their induction period [Luft, Firestone, & Wong, 2011]; teachers identified as expert [Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012]) and in different contexts (e.g., without regard to level of

experience and expertise [Liu, 2011]; in the context of professional development or professional learning communities, often designed to target teachers' beliefs and or practices [Rushton, Lotter, & Singer, 2011]). We raise this point to highlight the diversity in types of teachers studied and to offer an additional reason for conflicting results on the relations between beliefs and practices.

This body of empirical work, as well as seminal works (e.g. Calderhead, 1996; Pajares, 1992; Richardson, 1996; Woolfolk-Hoy et al., 2006), and more recent reviews of the literature (e.g. Basturkmen, 2012; Fives & Buehl, 2012; Mansour, 2009) serve as the basis for this chapter. Given the expansive literature related to teachers' beliefs, this is not meant to be a comprehensive review. Instead, our intention is to highlight current issues relevant to understanding the relationship between teachers' beliefs and practices for researchers interested in exploring teachers' beliefs and practices in a particular context.

POSSIBLE RELATIONS BETWEEN TEACHERS' BELIEFS AND PRACTICES

Discussions of teachers' beliefs typically include at least some reference to the connection between teachers' beliefs and practices. However, the nature and importance of this relationship has been disputed. In the following sections, we briefly present evidence of different perspectives on how teachers' beliefs and practices may relate to each other.

Beliefs Influence Practice

Beliefs are often identified as precursors to behavior (i.e., individuals enact practices based on the beliefs that they hold [e.g., Pajares, 1992]). Support for this view has been ascertained by identifying teachers' beliefs through surveys, interviews, or other evidence (e.g., written reflections, statements during professional development) and then examining them in relation to reported or observed practices. When teachers' beliefs are correlated with, aligned to, or reflected in their practice, various researchers have concluded that teachers' beliefs influence their practices. For instance, Wilkins (2008) found that for 481 American elementary teachers, beliefs about the effectiveness of inquiry were the strongest direct predictor of inquiry instructional practices. Using structural equation modeling, Brown, Harris, and Harnett (2012) found that primary and secondary teachers' conceptions of teacher feedback were differentially related to their feedback practices. Further, teachers' self-efficacy beliefs have been routinely identified as predictors of practices (e.g., classroom goal structures [Ciani, Summers, & Easter, 2008]; culturally responsive teaching [Siwatu, 2009]; instructional practices [Thoonen, Slegers, Peetsma, & Oort, 2011]). However, in quantitative studies, the identified relationships between beliefs and practices are often weak to moderate and data are typically collected at the same time, often through self-report measures (e.g., Thoonen et al., 2011; Wilkins, 2008).

In contrast, qualitative studies of teachers' beliefs and practices tend to rely on multiple data sources (e.g., interviews, surveys, observations, lesson plans, student artifacts) collected over a period of time from various sources (e.g., teachers, researchers, students). For instance, Tsangaridou (2008) interviewed two student

teachers before a 13-week student teaching experience, observed six periods of physical education per teacher, and analyzed relevant documents (i.e., unit plans, lesson plans, and reflective journals). Based on these data, the author concluded that the student teachers' articulated beliefs about physical education were reflected in their practices. Song and Looi (2012) conducted case studies of two teachers with markedly different beliefs about student learning, identified through interviews and videotaped professional development sessions, as they implemented the same lesson plan on fractions and division. Based on a moment-by-moment analysis of instructional practices, classroom interactions, and student learning, the authors concluded that teachers with innovation-oriented beliefs implement patterns of inquiry-principle-based practices that in turn support meaningful student-inquiry learning.

Practice Influences Beliefs

An alternative to the argument that beliefs are precursors to practice is the position that teachers' beliefs are shaped by engaging in specific actions and practices (e.g., Guskey, 1986). Support for this connection between beliefs and practices is seen most readily in studies on the effects of professional development on practicing teachers' beliefs and the effects of field experiences on preservice teachers' beliefs. That is, changes in beliefs have been identified after experiences in which practicing or preservice teachers engaged in specific classroom practices.

The influence of teachers engaging in specific practices on their beliefs is often seen in the context of teachers' teaching self-efficacy beliefs or other ability-related beliefs (e.g., capability beliefs). As theorized by Bandura (1997), individuals gain information about their capability to perform a task by personally engaging in it. However, for teaching self-efficacy beliefs to increase it is important that individuals experience success. Thus, the level of support that teachers receive during the experience may determine whether self-efficacy beliefs will increase, decrease, or remain unchanged (i.e., Lumpe, Czerniak, Haney, & Beltyukova, 2012; Tschannen-Moran & McMaster, 2009; Yilmaz & Cavas, 2008). In their quasi-experimental study, Tschannen-Moran and McMaster (2009) found that some teachers who received professional development without follow-up coaching (i.e., additional support and greater potential to experience success) decreased in their sense of teaching self-efficacy. Additionally, Lumpe et al. (2012) found that elementary teachers increased in their science teaching self-efficacy after participating in a professional development program that included 80 hours of summer professional development, bi-weekly visits and coaching for a trained support teacher throughout the academic year, and participation in a lesson study in which each teacher reflected on the strengths and weaknesses of a lesson they wrote. These findings indicate that engaging in specific teaching practices can increase teachers' sense of self-efficacy beliefs when they experience success with those teaching practices.

There is also evidence that engaging in specific practices can change other teacher beliefs (e.g., beliefs about inclusion [Swain, Nordness, & Leader-Janssen, 2012]; beliefs about classroom management [Yilmaz & Cavas, 2008]; beliefs about inquiry [Rush-ton et al., 2011]). For instance, Swain et al. (2012) found that there were increases in preservice teachers' beliefs about the inclusion of students with special needs after they completed an introductory special education class that included a 20-hour field component in which the preservice teachers observed and worked with students

with disabilities. Similarly, Rushton et al. (2011) found that high school chemistry teachers were more likely to endorse inquiry views of science teaching after participating in professional development that included a two-week summer institute and support throughout the academic year. In contrast, Yilmaz and Cavas (2008) found that after participating in a teaching practicum, preservice teachers became more controlling with respect to their beliefs about managing students and less controlling with respect to managing instruction. Together these findings demonstrate how engaging in specific practices may influence the beliefs that teachers hold.

Teachers' Beliefs Are Disconnected From Their Practices

Findings from other studies have led researchers to conclude that teachers' beliefs are not related or are disconnected, misaligned, or inconsistent with classroom practices. For example, in a study with 1,340 elementary school teachers, Liu (2011) found that although 79% of teachers held learner-centered beliefs, the majority of them reported lecturing instead of using more constructivist practices with technology. When Jorgensen, Grootenboer, Niesche, and Lerman (2010) assessed 25 teachers' beliefs about various pedagogical practices through the use of a survey and then analyzed videotaped recordings of their practices, they identified four areas of inconsistency between teachers' beliefs and practices (i.e., inclusiveness/importance of culture, group work, connectedness of ideas, and multiple pathways). Teachers strongly endorsed the practices as important, but there was little evidence of them in their teaching and/or the practices were implemented in an ineffective manner. In Lim and Chai's (2008) study of six teachers as they planned and implemented computer-mediated lessons in mathematics, science, and English, five of the six teachers expressed a constructivist orientation to teaching but observed lessons were judged to be predominately traditional. Such studies are used as evidence that beliefs and practices may not be related.

Reciprocal, but Complex, Relationships Between Teachers' Beliefs and Practice

Another alternative to those positions already discussed, and in our view a more accurate alternative, is that there is a reciprocal, but complex, relationship between teachers' beliefs and practices (Basturkmen, 2012; Mansour, 2009). That is, beliefs and practices influence one another (Richardson, 1996; Thompson, 1992) and the strength of this relationship may vary across individuals and contexts as well as the type of beliefs and practices being assessed.

Longitudinal studies of preservice and practicing teachers' beliefs and practices provide evidence of the reciprocal and dialectical relations between beliefs and practices (e.g., Mouza, 2009; Turner et al., 2011). For instance, Kang (2008) examined how preservice secondary science teachers translated their personal epistemologies and science teaching goals into specific actions during a science methods course that included a six-hour a week field experience in which the preservice teachers observed and taught science lessons. Although 48% of the 23 preservice teachers in the sample kept their initial personal epistemologies and science teaching goals and enacted these beliefs in their teaching (suggesting that for those teachers beliefs influence practice), 30% of participants engaged in practices that were different from their initial beliefs. Specifically, five preservice teachers enacted more sophisticated practices

(e.g., engaging in inquiry-based activities and asking thought-provoking questions) than their beliefs would have suggested in an effort to “try out” the methods advocated in their science methods classes. After being successful in these practices, these preservice teachers experienced a shift in their personal epistemologies and teaching goals. Five other preservice teachers in the study were not satisfied when their teaching actions did not reflect their beliefs, including three who developed more sophisticated views of science and teaching after engaging in the field experience. These individuals left the course planning to try alternative teaching practices in the future.

In a four-year case study of an elementary teacher that spanned her last year of teacher preparation through her first three years of teaching, Potari and Georgiadou-Kabouridis (2009) documented how the teacher's initial beliefs about teaching elementary students the concept of number were challenged, and ultimately modified, during her student teaching and first-year teaching experiences. The changes in her beliefs influenced future teaching decisions and prompted her to seek out additional opportunities to develop her mathematics teaching. Such findings show how engaging in practices informs teachers' beliefs which then affect subsequent actions.

With respect to the strength of the relationship between teachers' beliefs and practices, for the studies discussed in the previous sections it is also important to note there was never a perfect correspondence between beliefs and practices, nor a complete lack of relationship. For instance, Lim and Chai (2008) concluded teachers' beliefs and practices were misaligned based on five out of six teachers expressing a constructivist orientation but implementing lessons that were predominately traditional. However, 80% of lessons had some constructivist elements. Further, in their study, one teacher expressed a more traditional view of teaching and implemented more traditional lessons (i.e., beliefs are aligned for some teachers, but mismatched for others). Similarly, Jorgensen et al. (2010) identified four areas of inconsistency between teachers' beliefs and practices (i.e., inclusiveness/importance of culture, group work, connectedness of ideas, and multiple pathways) but there were two other areas (i.e., intellectual quality, learning environment) in which teachers' beliefs and practices were consistent. Thus, as noted elsewhere, “it is not a matter of whether beliefs and practices are or are not congruent but rather the degree of congruence or incongruence between beliefs and practices” (Fives & Buehl, 2012, p. 481). Instead of seeking evidence that beliefs are or not related, alternative lines of inquiry should seek to understand the variations in the relations between beliefs and practices as well as the consequences of belief congruence and incongruence.

Variations in the relations between beliefs and practices based on experience.

From our review of the identified studies, the teacher's level of development and expertise is one factor that may contribute to the congruence of beliefs. For instance, Ertmer et al. (2012) examined the beliefs and technology integration practices of 12 K-12 teachers recognized for their award-winning technology practices. For 11 of the 12 teachers, their espoused beliefs about teaching and technology were evident in their practices assessed from documents available on the teachers' websites. Ertmer et al. (2012) characterized the one teacher whose belief and practices did not align as being “in transition.” This teacher expressed student-centered beliefs but her use of technology was predominately skill-based. However, there was evidence that the teacher was beginning to use technology to make instruction more student-centered.

In their study of preservice teachers' beliefs about physics instruction, Ogan-Bekiroglu and Akkoc (2009) classified the preservice teachers' beliefs and practices for four "clusters" of teaching (i.e., classroom environment, teaching activities and assessment, teacher's role, and instructional goals) as constructivist, traditional, and transitional (i.e., a mix of both constructivist and traditional). The preservice teacher identified as having transitional beliefs displayed the greatest inconsistency between his beliefs and practices. This study also suggests that when teachers' beliefs are in flux, they may not necessarily align with observed practice. Additionally, in a review of 17 studies examining language teachers' beliefs and practices, Basturkmen (2012) found that beliefs and practices were more consistent for experienced teachers than less experienced teachers. The lack of relationship between teachers' beliefs and practices may be attributable to changes in teachers' beliefs that are not yet reflected in their practices or vice versa and, thus, may represent a natural part of teacher development.

Variations in relations between beliefs and practices based on the type and function of beliefs. The relation between teachers' beliefs and practices may also vary based on the types of beliefs under consideration (Pajares, 1992), their position within a teacher's belief system (Green, 1971) and the functions that the beliefs serve (Fives & Buehl, 2012). That is, some beliefs may be more or less related to specific practices based on the content of the belief and practice. For instance, in one study, beliefs about instructional teaching self-efficacy were more predictive of classroom teaching practices whereas classroom management teaching self-efficacy beliefs were not (Ciani, Summer, & Easter, 2008). Additionally, core beliefs are more strongly held (Green, 1971), and thus, perhaps, more strongly related to teachers' practices than peripheral beliefs. Phipps and Borg (2009) found that language teachers' more peripheral beliefs about language learning were not reflected in their grammar teaching practices whereas teachers' core beliefs about student learning were observed in their classroom practices. Moreover, given that beliefs are held in clusters in such a way that incompatible beliefs can simultaneously co-exist (Green, 1971), conflicting beliefs may exist within a teacher and be differentially related to the teacher's practice depending on the context. For instance, one teacher in Cross's (2009) study held conflicting beliefs about mathematics, student learning, and mathematics teaching. Thus, depending on the context (e.g., type of student and nature of the content) and which belief is assessed, for this teacher, the belief-practice relationship may or may not appear to be congruent.

Beliefs may also play different roles in relation to a specific practice or action (i.e., filter, frame, or guide [Fives & Buehl, 2012]); and other aspects of the belief system, or broader context, may intervene, potentially obfuscating the relationship. That is, those beliefs that are more proximal to a teacher's actions are more likely to be easily identified in his or her classroom practice. Thus, beliefs that are implicitly used to filter and interpret new information may not be as readily observed in the classroom as those beliefs that are used to frame a specific problem or task (e.g., lesson planning), and guide immediate action. For instance, Uzuntiryaki, Boz, and Kirbulut (2010) analyzed preservice teachers' beliefs about constructivism, lesson plans, and classroom instruction. They identified instances in which lesson plan components that reflected the preservice teachers' expressed constructivist beliefs were not implemented in practice. Although constructivist beliefs were related to the framing and

planning of the lesson, other beliefs guided the teachers' actions in the classroom. If the researchers had only observed classroom practice, without examining the lesson plans, they would have missed evidence that aspects of the teachers' constructivist beliefs were reflected in some aspects of their practice (i.e., lesson planning but not classroom actions). Consequently, the consistency between teachers' beliefs and practices may depend on the function a specific belief served, and its position within a teacher's belief system and the aspect of practice that was assessed, and, as we will discuss, various internal and external factors.

Consequences of Belief Congruence/Incongruence

Researchers often target beliefs as a way to influence or change teachers' practices to be aligned with what are viewed as current best practices. Thus, the value of studying and targeting beliefs rests on their predictive relationship to practice. Evidence that beliefs influence practice supports their worth; conversely, evidence that beliefs and practices are not related or that engaging teachers in specific behaviors is effective in changing classroom instruction is used to discount the importance of teachers' beliefs. However, there are other consequences to the congruence or incongruence of beliefs and practices that should be considered.

When teachers are required to implement practices that are at odds with their beliefs about teaching and what is best for students, teacher satisfaction and well-being may be adversely affected (e.g., de Jong, 2008; Potari & Georgiadou-Kabouridis, 2009). One may argue that beliefs will change in time or that they are irrelevant if teachers are engaging in the desired practices. However, these teachers may ultimately leave the teaching profession or implement the practices in an ineffective manner (i.e., distort the implementation of the practice based on their beliefs). For instance, middle school teachers in Greene et al.'s (2008) study of the effects accountability policies (i.e., No Child Left Behind) on teachers' practices noted accountability requirements negatively impacted teachers' sense of connections with their students and that high-quality teachers were leaving the profession in response to pressure to perform in ways that did not meet the cognitive and social needs of their students.

Additionally, congruence between beliefs and practices may not be a desirable state if teachers are implementing practices based on maladaptive beliefs. For instance, Uzuntiryaki et al. (2010) found that beliefs and practices were most consistent for preservice teachers with weak constructivist beliefs (i.e., more of a transmissionist view). Similarly, Lim and Chai (2008) found that the teacher in their study who expressed more traditional views of teaching consistently implemented traditional lessons.

SUPPORTS AND HINDRANCES TO THE ENACTMENT OF BELIEFS

In our current review of studies that examined the relationship between teachers' beliefs and practices as well as recent reviews (e.g., Basturkmen, 2012; Fives & Buehl, 2012; Mansour, 2009), various factors were identified as supports or hindrances to teachers in implementing their beliefs. A common distinction that is made pertains to whether those factors are internal (i.e., within the teacher) or external (i.e., residing in the environment [e.g., Ertmer et al., 2012; Liu, 2011]). We adopt this approach

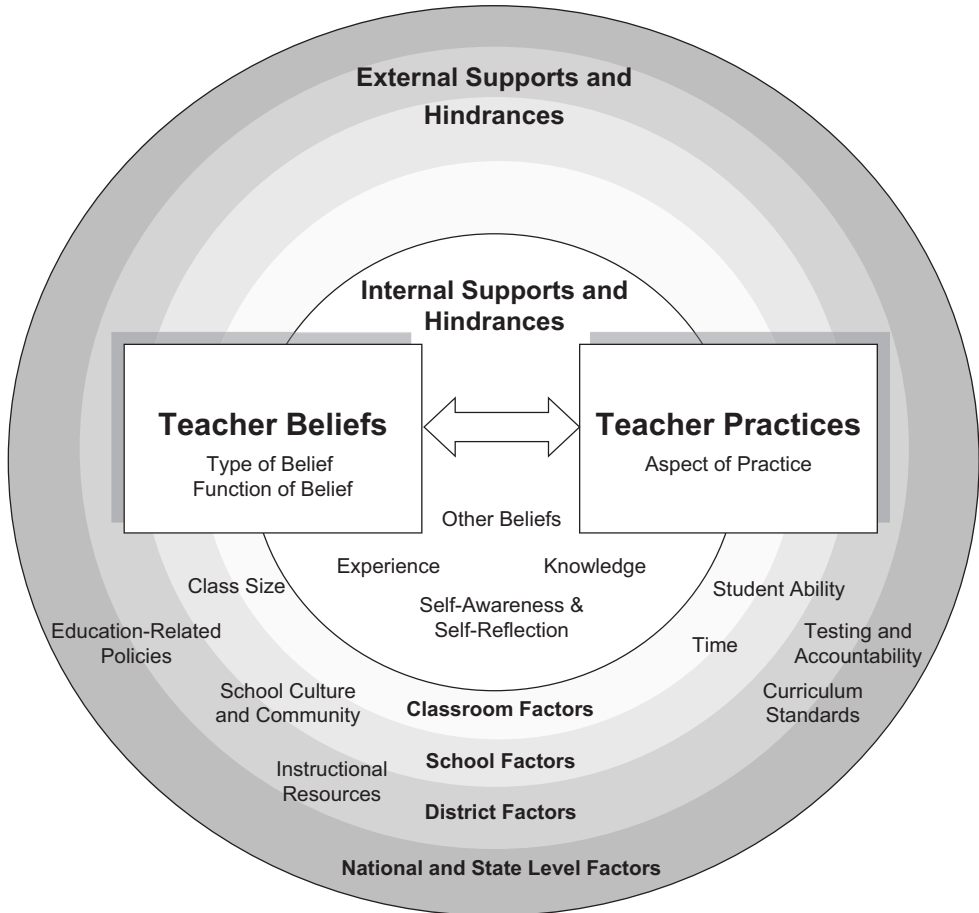


Figure 5.1 Relationship between teachers' beliefs and practices in a system of internal and external supports and hindrances.

but also extend it to incorporate an ecological model (Bronfenbrenner, 1989) to reflect the various embedded levels of external factors, as others have also done in discussing teachers' knowledge and beliefs (Woolfolk-Hoy et al., 2006) as well as classroom practices (Patrick, Mantzicopoulos, & Sears, 2012). As seen in Figure 5.1, the belief-practice relationship exists within a broader multi-leveled context of various internal and external factors.

Internal Factors

Our review of studies from 2008 to 2012 identified several factors within teachers that either supported or impeded them from enacting their espoused beliefs in practice. Such factors included other beliefs, knowledge, experience, as well as teachers' levels of self-reflection and awareness.

Other beliefs. As previously noted, teachers hold beliefs about many different topics (e.g., Woolfolk-Hoy et al., 2006), these beliefs exist in a multidimensional system in which some beliefs are more central than others (e.g., Ogan-Bekiroglu & Akkoc, 2009), and teachers may hold beliefs that are contradictory (e.g., Cross, 2009; Green, 1971). Thus, aspects of a teacher's own belief system may either facilitate or impede the enactment of beliefs into practice. Teachers' capability and self-efficacy beliefs may explain some of the inconsistencies between teachers' beliefs and practices (e.g., Ogan-Bekiroglu & Akkoc, 2009; Tang, Lee, & Chun, 2012) in that teachers are more likely to act on their beliefs about content and various aspects of instruction when they believe in their own capability to do so. In such cases, teachers' capability and self-efficacy beliefs are moderating the relation between teachers' beliefs about content and their classroom practices. That is, the extent to which teachers' content beliefs are reflected in their instruction depends on, or are moderated by, whether they are confident in their knowledge and skills. Other studies have found that teachers' capability and self-efficacy beliefs serve as mediators, accounting for how other beliefs are related to specific practices. For instance, Nishino (2012) found that the effects of teachers' beliefs about communicative language on their classroom practices were mediated by self-efficacy beliefs for language teaching. That is, teachers' beliefs about communicative language predicted their sense of self-efficacy for language teaching, which in turn predicted their classroom practices.

Teachers' sense of responsibility for students' learning has also been identified as a possible moderator and mediator in the alignment of teachers' beliefs and practices. For instance, based on classroom observation and interview data from an exemplary teacher and six beginning teachers, Roehrig, Turner, Grove, Schneider and Liu (2009) proposed a model for how a metacognitive feedback loop may align teachers' beliefs and practices. They proposed that teachers' sense of responsibility beliefs may moderate the relationship between beliefs about teaching practices and students and teachers' actual classroom practices (i.e., teachers' practices are more likely to align with their beliefs when teachers feel responsible for their student outcomes). Additionally, they proposed that responsibility beliefs may mediate, or serve as the mechanism between, the effects of metacognitive awareness on classroom practices. Turner et al. (2011) also identified teachers' sense of responsibility as an important factor in their willingness to attempt new teaching practices to support students' motivation.

Teachers' beliefs about aspects of their immediate teaching context are also influential. In particular, teachers' beliefs about the malleability of student ability and motivation (Mouza, 2009; Turner et al., 2011) as well as beliefs about students' proficiencies, expectations, and needs (Nishino, 2012; Southerland et al., 2011; Tang et al., 2012) were identified as important across various contexts. Moreover, when teachers believe in students' capabilities, as well as their own, such beliefs may override other less adaptive beliefs. For instance, Hertzog (2011) found that even though a teacher held deficit views about students' home languages and cultures, she believed strongly in her students' capability to learn. She approached her students with respect and demonstrated many effective practices for language learning. In essence, the teacher must believe in his or her ability to implement a practice, view him or herself as responsible for students' learning, and believe that students are capable of learning for beliefs about content and instruction to be implemented in practice.

Knowledge. To enact their beliefs, teachers need to possess the necessary knowledge. In some cases, researchers found that preservice and practicing teachers did not act on their beliefs due to a lack of knowledge of the content (e.g., mathematics [Bray, 2011]; science [Kang, 2008]; Rushton et al., 2011), and in other cases they lacked the pedagogical knowledge of how to implement the instructional practices that would align with their beliefs (e.g., Jorgensen et al., 2009; Teague, Anfara, Wilson, Gaines, & Beavers, 2012). For instance, Ogan-Bekiroglu and Akkoc (2009) found that although preservice teachers held constructivist beliefs about physics instruction, the lack of the science content knowledge as well as the knowledge and skills for implementing constructivist practices hindered the extent to which their beliefs were observed in practice. Moreover, Mouza (2009) noted the importance of content knowledge, pedagogical knowledge, *and* pedagogical content knowledge in order for teachers to enact the beliefs about technology instruction that were developed during a yearlong professional development experience.

Self-awareness and self-reflection. The extent to which teachers are self-aware and engage in self-reflection are other factors related to the alignment between teachers' beliefs and practices. That is, a lack of self-awareness may allow teachers to enact practices that are not aligned with their beliefs (Roehrig et al., 2011). However, when teachers discuss the tensions between their beliefs and practices such inconsistencies can be brought to light and beliefs and or practices can be modified (Phipps & Borg, 2009). Indeed, self-reflection is essential to aligning beliefs and practices for preservice and practicing teachers (e.g., Kang, 2008; Potari & Georgiadou-Kabouridis, 2009) as well as developing more coherent sets of beliefs (e.g., Ogan-Bekiroglu & Akkoc, 2009). Thus, teachers need to be made aware of and reflect on the congruence and incongruence of their beliefs and practices.

External Factors

Various external factors were identified as possible facilitators or impediments to teachers enacting their beliefs in practice. Here we have organized them by various levels, starting with those in the immediate environment. As reflected in Figure 5.1, these levels are embedded within one another such that similar pressures or issues at one level may be instantiated differently depending on the context and they may affect other external factors at different levels. We represent this in Figure 5.1 by having terms cut across the different levels of external supports and hindrances as well as placing related external factors in proximity to each other. Moreover, research suggests that even in spite of potential challenges and barriers, teachers can enact practices that reflect their beliefs (e.g., Cincotta-Segi, 2011). In many cases, a teacher's perceptions of these challenges are important in determining whether the teacher does or does not enact his or her beliefs (Bullock, 2010) and their ability to work creatively within the external constraints.

Classroom-context factors. Classroom-level factors, such as student ability (Savasci & Berlin, 2012), student attitudes (Bullock, 2010; Southerland et al., 2008), classroom management (Phipps & Borg, 2009; Teague et al., 2012), and class size (Dooley & Assaf, 2009), present challenges to both practicing and preservice teachers in enacting their beliefs, but these factors also have been shown to force these two types of teachers to find ways to enact practices despite potential challenges or

barriers. For instance, Savasci and Berlin (2012) found that participants reported using constructivist teaching methods more frequently with higher ability or older students.

Student attitudes and preferences for instruction as well as students' overall dispositions and behaviors also influence the practices teachers implement (Bullock, 2010; Southerland et al., 2011). In studies of constructivist beliefs, teachers have reported not implementing inquiry learning due to students' reluctance to engage in higher level thinking (Kang, 2008); in fact, Savasci and Berlin (2012) found that students preferred worksheets to inquiry-based instruction in order to avoid deep thinking. Southerland et al. (2011) found that students' disinterest and low self-efficacy in science presented challenges to science teachers who held ethnocentric beliefs (i.e., those teachers who believed that their own culture was superior to that of their students who came from low-socioeconomic backgrounds). Although these teacher-participants recognized their ethnocentric beliefs, they still cited student misbehavior as a barrier to enacting equitable science instruction for all students—thus conveying the notion that it is teachers' perceptions of barriers to implementing instruction that can be powerful in preventing teachers from enacting their beliefs.

Others have shown how classroom management issues determine the extent to which teachers act on their beliefs. For instance, middle school teachers cited students' misbehavior as a barrier to implementing developmentally appropriate instruction (Teague et al., 2012); similarly, in another study (Savasci & Berlin, 2012) constructivist-oriented secondary teachers were reluctant to implement group work because of student misbehavior. Large class sizes have also been noted to limit the implementation of practices teachers view as effective (Uzuntiryaki et al., 2010).

For preservice teachers, working in another teacher's classroom or under the supervision of a cooperating or mentor teacher may present additional challenges for acting on their beliefs about teaching. For example, Kang (2008) found that preservice science teachers were reluctant or unable to enact certain instructional practices because they were teaching in someone else's classroom, the students were not their own, and they did not have relationships with the students. In another study, Ogan-Bekiroglu and Akkoc (2009) found two of the preservice teachers in their study were unable to implement constructivist teaching strategies because their mentors expected them to use activities such as multiple choice questions and to cover multiple topics in one lesson. Such studies highlight how preservice teachers may not be fully supported in enacting their beliefs during their field experiences.

School-context factors. Much like classroom-level factors, school-context factors can pose challenges to teachers in acting upon their beliefs, but what is most important is how teachers perceive these potential barriers. Administration, parental support, and colleagues as well as the available resources in a school can support or hinder the relationship between teachers' beliefs and practices (e.g., Potari & Georgiadou-Kabouridis, 2009; Rentzou & Sakellariou, 2011; Southerland et al., 2011). Bullock (2010) found that when teachers lacked the resources they needed to feel successful (i.e., ready-made activities, professional development, and/or guidance), their practices did not accurately reflect their beliefs. However, Bullock emphasized that these constraints may not be accurate; what is most important is teachers' perceptions of potential barriers to practice.

The role of school culture and community is another school-level factor that may support or hinder teachers in acting on their beliefs. For instance, Ciani et al. (2008) explored how a school-wide performance goal structure influenced teachers' collective self-efficacy and instructional practices. Teachers at high-performance oriented schools (i.e., those that fostered a climate of student academic competition) had lower self-efficacy for instruction, classroom management, perceived collective efficacy, teacher community, and perceived mastery school goal structure than teachers in schools with a low performance goal orientation. Using a path model, the authors found that teacher community positively related to the perceived collective efficacy of the teaching faculty; this perceived collective efficacy was positively related to teachers' self-efficacy for student engagement, instruction, and classroom management and negatively related to teachers' performance classroom goal structure. Additionally, teachers' sense of efficacy for instruction positively related to a mastery classroom goal structure such that self-efficacy beliefs for instruction explained the relation between collective self-efficacy and mastery classroom goal structure. That is, the practices teachers implemented in their classrooms were related to their teaching efficacy beliefs as well as the teacher community and collective teaching efficacy in the school.

National-, state-, and district-level factors. Education policies and curricular standards, in the United States and abroad, may present challenges to teachers in enacting practices congruent with their beliefs (Cincotta-Segi, 2011; de Jong, 2008; Tan, 2011; Valdiviezo, 2009). However, the influence of these external factors depends on the type of policy, the teachers' role in the political context, and teachers' individual perceptions.

Language instruction is one area in which policy may affect teachers' beliefs and practices (Cincotta-Segi, 2011; de Jong, 2008; Tan, 2011; Valdiviezo, 2009). In the United States, de Jong (2008) studied the influence of Question 2, an English-only law passed in Massachusetts in 2002, on bilingual and structured English immersion (SEI) elementary teachers' beliefs and practices. The teachers who participated in this study expressed both negative and positive reactions to the policy and its effect on their classroom practices; significantly, many bilingual and SEI teachers experienced extreme emotional conflict when they were forced to teach children in ways that were not culturally responsive and thus did not align with their beliefs. A similar law was passed in the Lao People's Democratic Republic (LPDR) declaring Lao the official language of that country. Cincotta-Segi (2011) studied how one teacher in a remote village balanced his own beliefs to instruct students in their home language of Kmhmu against the restraints imposed on his beliefs and teaching by this policy. The participant used the students' home language (L1) for significant teaching events and also more creatively (e.g., by using L1 texts to connect students background knowledge to L2 texts) in order to scaffold the information for students so that they could create their own meanings.

Curriculum standards create pressure for content coverage for administrators, practicing teachers, and preservice teachers in field-based experiences (e.g., Dooley & Assaf, 2009; Greene, Musser, Casbon, Caskey, Smaek, & Olson, 2008), and, much like national policy, play out differently in various contexts. In Greece, Potari and Georgiadou-Kabouridis (2009) studied a young teacher, Christina, from her preservice program into her first years of teaching. During her first year in her own

classroom, Christina cited the national curriculum as a constraint on her exploratory teaching practices. In the United States, the No Child Left Behind (NCLB) law has had a notable effect on teachers and students due to its emphasis on student achievement in mathematics and reading (Dooley & Assaf, 2009; Greene et al., 2008). For instance, Greene et al. (2008) discovered that American middle school teachers in their sample (i.e., 162 from 13 schools) reported that NCLB had a negative influence on their practices, particularly those serving low-income students.

IMPLICATIONS FOR RESEARCH AND PRACTICE

In this chapter, we addressed possible relations between teachers' beliefs and practices, the potential consequences of the belief congruity/incongruity, as well as internal and external factors that may support or hinder teachers in implementing their beliefs in practice. This body of work holds specific implications for both research and practice.

First, when researchers design investigations to study the relationships between teachers' beliefs and practices, careful consideration must be given to who the teachers are. Although the majority of studies have been conducted with practicing teachers, as our review highlighted, teachers vary in terms of their level of experience and the extent to which their beliefs are stable or in flux. Consequently, when teachers' beliefs or practices are undergoing changes, the two may not align. Thus, the lack of congruence between beliefs and practice should not be cause to discard the potential of beliefs. Additionally, when teachers' beliefs are in flux there are unique opportunities to study the development of teachers' beliefs. Thus, teacher education programs and professional development are ideal settings for longitudinal studies of how teacher' beliefs and practices develop over time. Moreover, we identified few studies that followed participants from their teacher education program (i.e., preservice) into the early years of their professional practice (i.e., first three years of teaching; Potari & Georgiadou-Kabouridis, 2009). Such investigations are likely to inform researchers and teacher educators on how beliefs and practices influence one another over time as well as how teacher educators can better prepare teachers for the realities they will face in the classroom.

Second, researchers also need to give careful consideration to the types of beliefs and practices that they assess, including how the beliefs they target may be situated within the teachers' larger system of beliefs and the functional relationship between specific beliefs and practices. For instance, in discussing belief systems, Green identified three dimensions of beliefs related to their structure (i.e., primary vs. derivative), strength (i.e., core vs. peripheral), and clustered nature (i.e., contradictory beliefs may be simultaneously held in separate clusters). Fives and Buehl (2012) also discussed how beliefs may serve different roles in relation to teachers' actions and cognition. That is, some beliefs filter information whereas others are used to frame a problem and still others may act as specific guides to action. Such frameworks may serve as analytic tools for researchers to broaden their data collection and analysis beyond their initial focus (e.g., teacher self-efficacy beliefs; beliefs about inquiry in mathematics or science). By considering the role that beliefs play in relation to practice as well as how a specific belief relates to other aspects of a teachers' belief system, researchers may include a broader variety of beliefs and practices yet at the same

time be more precise in terms of the beliefs that are likely to be relevant. Moreover, by including a broader array of specific beliefs, researchers may be better able to explore the mechanisms that undergird the belief-practice relationship.

Third, more research is needed on the consequences of belief and practice incongruence. As we have noted, the lack of congruence may explain individuals' dissatisfaction with teaching as a career as well as why skilled veteran teachers are leaving the profession or seeking other positions (e.g., de Jong, 2008; Greene et al., 2008). However, a misalignment between teachers' beliefs and practices can also spur them to make changes and try new techniques (e.g., Roehrig et al., 2009; Kang, 2008). Thus, additional research is needed to explore the implications for belief-practice incongruity including how it can be productively harnessed to promote teachers' development and continued engagement in teaching.

Fourth, as evident from the above discussion, there are various internal and external supports and hindrances to teachers enacting their beliefs. These factors are simultaneously present and may interact to influence teachers' practices. For instance, Dooley and Assaf (2009) presented a cross-case analysis of a suburban and an urban language arts teacher in the southern United States. Even though the two teachers held similar beliefs about language arts instruction and were subject to high-stakes testing and accountability, their instructional practices were different as a result of administrative pressure, available resources, transient student enrollment, and district pressures.

The study by Dooley and Assaf (2009) demonstrates how external factors are present at various levels. Based on their study, Lim and Chai (2008) concluded that teacher beliefs alone are an insufficient condition for modifying traditional teaching practices (i.e., external factors must also be addressed). We would add to this that addressing isolated external factors (e.g., providing more instructional time or resources) may also not be sufficient for changing beliefs and practices. This is not to say that teachers' beliefs and practices cannot be changed until there are broad changes in culture and national policies. Instead, it is a caution that for more local changes to be effective, they must take the broader context into account.

From a research perspective, the complex and embedded nature of the supports and hindrances highlights the need for researchers to consider a variety of factors when examining the relations between teachers' beliefs and practices. As previously noted, Bronfenbrenner (1989) provided a useful framework for conceptualizing the various factors that may influence teachers' practices. However, few systematically use it in studying the relations between teachers' beliefs and practices. Thus, more attention is needed to the specific ways internal and external factors can influence the congruence between teachers' beliefs and practice.

From a practice perspective, it is also important to explore the factors or approaches that may better prepare teachers to enact their beliefs, even in the face of obstacles (e.g., explicit support for how the additional time or new resources can be used in a manner that will better support students' learning *and* meet the accountability requirements). Others have suggested that teacher education programs need to equip their graduates with the tools needed for implementing their beliefs in conditions that might otherwise impede teachers from doing so (Kang, 2008). As noted by Ertmer et al. (2012), perhaps the greatest emphasis should be given to addressing the internal barriers (e.g., low teaching efficacy beliefs, maladaptive beliefs about students, lack of content and pedagogical knowledge) that prevent teachers from acting on their beliefs

in the current context. Indeed, we also found evidence that highlighted the importance internal factors (e.g., the teacher's *perception* of external factors, sense of responsibility, teaching self-efficacy, and/or cultural beliefs; Roehrig et al., 2009; Southerland et al., 2008). However, as demonstrated by Cincotta-Segi's (2011) case study of one teacher in the LPDR, teachers can creatively enact their beliefs within external constraints. More studies that show how teachers can become agentive even within restrictive environments may illuminate how to better foster effective practices.

A systems approach to teachers' beliefs highlights the importance of fostering an integrated system of beliefs that will best support teachers in their practice and make them more resistant to external pressures. Thus, within teacher education programs, it may be advantageous for faculty to identify and focus on a core set of beliefs throughout an individual's teacher education program and provide a coherent set of experiences to support their development. Further, careful attention needs to be given to the selection and training of cooperating and mentor teachers so that preservice and novice teachers can be better supported in enacting practices that are aligned with their beliefs and current best practices (Ogan-Bekiroglu & Akkoc, 2009). That is, we identified studies in which preservice teachers were not able to enact their beliefs as they were learning their craft, due in part to their cooperating teacher. Such practice, and some experience with success in enacting one's beliefs, is essential for preservice teachers in developing their skills and solidifying their developing beliefs about teaching (e.g., beliefs about content, teaching practices, sense of teaching self-efficacy beliefs).

For practicing teachers, supports are also still needed for these individuals as they enter and continue to develop within the profession. This includes ongoing, high-quality professional development that offers needed knowledge, models for implementing beliefs into practice, and continued support in the form of mentoring and coaching. Further, in professional development, there appears to be a benefit in targeting both teachers' beliefs and their practices. That is, changes in one may be an impetus for changes in the other and, ultimately, when teachers' beliefs and practices are congruent they may experience greater satisfaction with their work, promoting long-term retention.

Finally, teacher educators should be attuned to the role that reflection and awareness play in supporting the congruence between teachers' beliefs and practices. For both preservice and practicing teachers, opportunities for self-reflection and discussion of the alignment of beliefs and practices are essential (Rushton et al., 2011). By raising this awareness, teachers can be more metacognitive and systematic in improving their own practice. Our hope is that with such efforts by researchers and practitioners the promise of beliefs to improve educational practice (Fenstermacher, 1979; Pajares, 1992; Pintrich, 1990) may finally be realized.

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Section II

Studying Teachers' Beliefs

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6

ASSESSING TEACHERS' BELIEFS

Challenges and Solutions

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Teachers hold a variety of beliefs about learning, curriculum, pedagogy, and student assessment (Alderman, 2004; Calderhead, 1996; Woolfolk-Hoy, Davis, & Pape, 2006), including goal orientations (Kucsera, Roberts, Walls, Walker, & Svinicki, 2011), beliefs about classroom testing (Leighton, Gokiert, Cor, & Heffernan, 2010), cultural diversity (de Wet & Gubbins, 2011), subject matter (Gregoire, 2003), students motivation (Peterson, Schreiber, & Moss, 2011), differences in teaching practice (Rose & Lim, 2011), classroom management (Gibbs & Powell, 2012), teaching efficacy and ability to impact students (Goddard, Hoy, & Woolfolk-Hoy, 2000; Labone, 2004; Tschannen-Moran & Woolfolk-Hoy, 2001), epistemological beliefs (Hofer, 2004; Maggioni & Parkinson, 2008) and congruence among beliefs (Ye & Levin, 2008). It is important to understand teachers' beliefs and their development in order to promote better teacher preparation and inservice development, as well as to understand the potential discrepancy between stated versus observed beliefs (Speer, 2005; Wilcox-Herzog, 2002). Because teachers' beliefs may be related to student achievement, it also is important to understand them in order to promote student motivation and achievement (Alderman, 2004; Woolfolk-Hoy et al., 2006).

This chapter is divided into five sections. This first section provides a brief overview of the chapter. Section two discusses conceptual issues related to the dimensionality and administration of instruments. The third section reviews 10 strategies that have been used in the literature to assess teachers' beliefs, including questionnaires, rating scales, concept maps, vignettes, essays and journals, portfolios, verbal reports, performance observations, drawings, and classroom artifacts. Section four provides an overview of the quality of instrument development, data collection standards, the reliability and validity of instruments, and the importance of constructing a validity argument based on different types of aggregated data that can be used to triangulate findings. Section five concludes with general principles for improving the quality

of individual assessments and evidence used to examine teachers' beliefs. Our main goal is to identify conceptual and measurement challenges when assessing teachers' beliefs and to provide clear-cut solutions to them. We do so by identifying four major challenges, providing a blueprint for a systematic validation plan, reviewing 10 commonly used assessment strategies, and summarizing essential assessment principles regardless of the type of research being conducted.

FOUR CONCEPTUAL CHALLENGES

Conceptualizing an assessment instrument begins with four general issues related to the purpose of the assessment, the dimensionality of the construct(s) being assessed, operational definitions for each construct, and an integrated theoretical framework that describes the relationship among constructs. Henceforth, we focus on instruments intended to measure teachers' beliefs or dispositions, using the *Goal Orientation towards Teaching* (GOTT) scale developed by Kucsera et al. (2011) to illustrate our recommendations. We selected this instrument for several reasons. One is that it measures goal orientations in teachers rather than students, which has been the primary focus of goal orientation theory. A second reason is that it is situated within a well-articulated theory first proposed by Dweck and Leggett (1988). Third, the GOTT measures three separate types of teacher goal orientations and links them to external criterion measures to assess convergent and discriminant validation, which we discuss below.

The purpose of an assessment instrument specifies its primary intended use, which usually focuses on either a measure of knowledge, performance skills, or attitudes. Knowledge refers to facts, concepts and larger conceptual frameworks for organizing domain-specific information. A performance skill refers to the demonstration of a skill through action-based evidence (e.g., performance observation) or an indirect measure of performance such as an essay, drawing, or portfolio. Attitudes refer to beliefs and dispositions about a specific phenomenon.

The purpose of the GOTT was to measure three separate teacher goal orientations, including *learning*, *proving*, and *avoiding* dimensions. The development of the GOTT focused on scale development, an analysis of reliability and validity of each scale, and an examination of how the three GOTT subscales are related to other relevant teaching outcomes. The findings reported by Kucsera et al. (2011) accomplished two important goals that focused on the development of psychometrically reliable and valid scales within the context of an existing theory, and related these scales to other similar scales such as teacher self-efficacy in order to illustrate the utility of the GOTT when evaluating teacher goal orientations.

The dimensionality of an assessment refers to how many distinct constructs (i.e., performance or psychological dimensions) are being measured. Some constructs may be one-dimensional while others are multidimensional. For example, Goddard et al. (2000) described two dimensions of teacher self-efficacy corresponding to *individual* and *collective* teaching efficacy. In contrast, Hofer (2004) and Schommer-Aikins (2002) each hypothesized four different epistemological constructs. Most questionnaires measure one to four distinct belief constructs, typically using 6 to 12 items to assess each separate dimension.

The GOTT proposed a three-factor structure in which the learning, proving, and avoiding subscales assessed different constructs. These constructs were conceptualized

as distinct constructs that measured different psychological phenomena described below. The three orientation constructs were predicted to be largely uncorrelated with one another. Generally, instrument validation studies specify the number of distinct constructs being measured, their relationship to each other, and their relationship to other variables of interest such as other types of teachers' beliefs.

Each construct on an assessment instrument should be operationally defined. For example, Bandura (1997) and Goddard et al. (2000) described *collective school efficacy* as the belief that teachers and administrators can work together successfully to educate their students. Ideally, the construct should be defined with enough specificity that there is little ambiguity when interpreting its meaning. A detailed operational definition also provides facets of a construct that are helpful for creating instruments to assess it. For example, from the definition of collective school efficacy we know that it is a collective belief about the ability to positively affect students through collaborative activities.

The GOTT specifies three separate goal orientation constructs. The learning scale was designed to measure the extent to which a teacher strives to continually improve his or her teaching skills, set challenging classroom goals, value effort, and persist given failures. The proving scale was designed to measure the extent to which the teacher focuses on positive judgments of competence from students and other teachers. The avoiding scale measured the extent to which the teacher tends to avoid activities of changes in order to prevent negative judgments of classroom performance.

In addition, a good assessment instrument also specifies the theoretical relationship between the constructs it measures. For example, Schommer-Aikins (2002) specified that individual epistemological beliefs such as *certain knowledge* (i.e., knowledge is unchanging), *fixed ability* (i.e., one's ability to learn is inborn and cannot be improved), and *quick learning* (i.e., individuals learn information quickly or not at all) are largely independent of one another. That is, beliefs about knowledge are not strongly correlated with beliefs about ability or learning. It is important to note that theoretical claims about the relationships among constructs may be hypothetical in nature, at least until they can be tested using empirical results that evaluate the theory. In terms of assessment design, the important point is that the constructs are clearly defined and a model or theory of how constructs are inter-related is proposed and tested. The predictions made by these models may be tested using simple correlations in an exploratory analysis, or through the use of confirmatory factor analysis (CFA) models that compare the goodness of fit of the model when the predicted relationships are included or excluded. Strong theoretical models will fit better when the predicted relationships are supported by the analysis.

The GOTT is situated within the goal orientation theory proposed by Dweck and Leggett (1988) and further developed over the last 25 years by a variety of researchers. In this theory, a learning orientation corresponds to the desire to improve one's competence in an activity (e.g., classroom teaching), whereas a performance orientation corresponds to a desire to prove one's competence and to avoid being judged as poorly performing in an activity. Although goal orientation theory has evolved, the learning and performance distinction still serves as the basis of the theory. The GOTT was conceptualized within this theory and the learning, proving, and avoiding scales were designed in a manner consistent with the theory and ongoing research.

TEN ASSESSMENT STRATEGIES

One of the most important questions facing researchers is how to collect data. Table 6.1 provides a summary of 10 general assessment strategies reported in the teachers' beliefs literature: questionnaires, verbal reports, performance observations, self-reflective writing, tests and exams, vignettes, scales, portfolios, visual representations, and instructional and classroom artifacts (Osterlind, 2010; Stiggins, 2011). Some of these strategies, such as questionnaires and verbal reports, are used to assess beliefs based on explicit self-report, whereas others such as tests and artifacts are used to assess outcomes related to teachers' beliefs. All of these strategies are helpful and essential to researchers because they capture nuanced beliefs using different methods that can be triangulated to support evidence-based inferences. We present

Table 6.1 Ten Assessment Strategies Used in Teachers' Beliefs Research

Type of Assessment Strategy	Purpose	Typical Design of the Assessment Tool	Example from Research Literature	Strengths
Questionnaires	Measure one or more specific beliefs.	Agreement with statements using a Likert scale.	Hofer (2004). Usher & Pajares, (2008). Kucsera et al. (2011).	Measures independent beliefs using same scale; can be used in statistical analyses; scores for different beliefs are comparable.
Verbal reports (i.e., interviews, think alouds)	Describe the structure, origin, and impact of beliefs. Describe the ongoing effect of beliefs.	A structured interview with scripted probes. Unrestricted thinking aloud during a target activity.	Koichu & Harel (2007); Zanting et al. (2001).	Depth and elaboration of response. In-depth justification of beliefs, evidence and behaviors. Insights into the real-time effects of beliefs.
Performance observations	Observe actions and activities in a classroom or experimental setting.	Task performance. Spontaneous actions by teacher. Teacher-student interactions.	Speer (2005); Roehrig et al. (2009).	Document the actions of teachers, which may be compared to stated beliefs.
Self-reflective writing (essays, journals, and blogs)	Describe and reflect upon the content, origin, and contextual factors affecting beliefs.	An essay focusing on target questions; ongoing journal or weblog entries.	Crooks et al. (2010); Luehmann & Tinelli (2008); Schoffner (2009).	Depth of response; justification of beliefs, documenting change in beliefs. Creating a web-based community of learners.
Tests and exams	Assess some aspect of teacher knowledge, skill, or ability.	Off-the-shelf assessments or researcher designed tests.	Facione & Facione (2007); Hall & West (2011); Torff (2005).	Provide measures of teachers' skills and ability that can be used as statistical control variables.

Vignettes	Assess a response to events and beliefs within a targeted situation.	Written response or agreement using a rating scale.	Coplan et al. (2011); Olafson et al. (2010).	Measures relative commitment to events and beliefs described in the vignette.
Scaled responses	Agreement with beliefs that span a continuum.	Situate oneself at a specific point on the belief continuum.	Stahl & Bromme (2007); Olafson et al. (2010).	Create common scale across beliefs. Compare relationships between beliefs.
Portfolios	Collection of work that demonstrates achievement and progress.	Electronic collection of relevant documents.	Chou (2012); Salisbury & Kymes (2007).	Documenting achievement and change in beliefs over time. Links data sources together to tell a story.
Visual representations	Describe the relationship among different beliefs.	Individuals use a concept map or drawing to link key concepts.	Chin & Teou (2010); Hancock & Gallard (2004).	Identifies key concepts and the relationships among beliefs and salient outcomes. Provide conceptual "big picture" of beliefs and practices.
Classroom artifacts	Pre-existing data that can be used to enhance triangulation and validity evidence.	Data within the classroom such as lesson plans, student work, public documents.	McMullen et al. (2006); Parke et al. (2006).	Provides additional information that may be used in conjunction with data of primary interest to researchers.

a brief summary of these assessment strategies below, as well as several recent examples of each method, to guide the reader. For each assessment strategy, we summarize the purpose of the strategy and the typical design of the assessment tool; provide examples; and summarize main strengths of the strategy in Table 6.1. In addition, we refer readers to a more detailed discussion of assessment strategies used to measure teacher quality that we found very helpful in our review (Moyer-Packenham, Bolyard, Kitsantas, & Oh, 2008), as well as an integrated set of assessment principles and methods (Pellegrino & Chudowsky, 2003). A number of sources also discuss general conceptual and measurement issues applicable to the assessment of teachers' beliefs (Aiken, 1999; Baker, 2007; Boekaerts & Corno, 2005; Labone, 2004; Osterlind, 2010; Schraw, 2010; Schraw & Olafson, 2008; Speer, 2005; Stiggins, 2011; Woolfolk-Hoy et al., 2006). Using a carefully selected set of assessment strategies provides a solution to many of assessment challenges described in this chapter.

Questionnaires are the most common assessment data collection strategy used in teachers' belief research. Questionnaires may be used in isolation or as part of a larger survey research data collection strategy (Fowler, 2009). Moyer-Packenham et al. (2008) found that 40 percent of studies investigating teacher quality used questionnaires and surveys, whereas approximately 10 to 15 percent of studies used one or more of the remaining strategies. Questionnaires are extremely useful for several reasons,

including they are easy to administer and score, measure multiple constructs within a single set of questions, are amenable to sophisticated statistical analyses, and provide a comparative baseline across different studies. Fowler (2009) provides detailed criteria for constructing and validating surveys and questionnaires. DeVellis (2003) also discusses the development and validation of questionnaires in detail.

One special advantage of questionnaires is that researchers may administer a variety of questionnaires simultaneously to assess both the primary constructs of interest such as teacher self-efficacy, as well as to evaluate the convergent and discriminant validity of targeted constructs with related constructs such as in-class teaching strategies and student achievement (Kucsera et al., 2011). Convergent validity suggests that two variables or constructs are related positively such as self-efficacy and learning, whereas discriminant validity suggests that two variables or constructs are related negatively such as self-efficacy and anxiety. For this reason, many studies use multiple questionnaires to examine the inter-relationship among beliefs (Elik, Wiener, & Corkum, 2010) or to examine the relationships among multiple beliefs and teacher demographic variables such as age, years teaching, content expertise, and teaching satisfaction (Leighton et al., 2010). Frequently, multiple questionnaires are used to develop and test confirmatory factor models (Rose & Lim, 2011).

Verbal reports consist of first hand verbalizations of thoughts, beliefs, and explanations related to teachers' beliefs, and may include structured and unstructured interviews (Ye & Levin, 2008), think alouds, blogs, and verbal logs. These reports may occur concurrently or retrospectively relative to an activity. Verbal reports are used commonly in teachers' beliefs research to help researchers gain an in-depth understanding of the origin, development, and impact of beliefs on teachers' thinking and behavior. Interviews are the most common assessment strategy, occurring in approximately 15 to 20 percent of studies (Moyer-Packenham et al., 2008). For example, Koichu and Harel (2007) used what they referred to as task-based interviews in which participants explained mathematics principles in order to better understand how beliefs affected instructional choices. These interviews were quite similar to think alouds in which individual describe their activities, thought processes, and reactions to as a task during or shortly after performance of the task. In contrast, Zanting, Verloop, and Vermunt (2001) used structured interviews to investigate the relationship between beliefs about mentoring and teaching practices. Jones, Miron, and Kelaher-Young (2012) used interviews with teachers, students, principals, and counselors to examine changes in teachers' beliefs after the introduction of a scholarship program called the Kalamazoo Promise. Bodur (2012) used both a 20-item questionnaire and semi-structured interviews to explore teachers' multicultural beliefs during a one-semester class. Rubin and Rubin (2012) and Willis (2005) provide comprehensive discussions of interviewing techniques.

Performance observations refer to observing real-time activities such as task performance, teaching, or in vivo interactions in a classroom setting or a controlled research environment that provide information about beliefs or activities that are related to beliefs (Stiggins, 2011). Foster (1999) and Smart, Peggs, and Burrige (2013) each provided a comprehensive summary of observation methods. Lyon (2011) studied the effect of teachers' beliefs on science assessment practices by observing how and when teachers assessed students and provided formative feedback. Lim and Chai (2008) observed and interviewed six teachers from two Singapore primary school

classrooms to determine whether pedagogical beliefs translated directly into congruent teaching practices. de Haes, Oort, and Hulsman (2005) used a standardized observation procedure and scoring rubric to assess students' attitude and diagnostic skills in a clinical practice setting.

A wide variety of educational studies have examined the consistency of classroom practice in relation to stated beliefs (Wilcox-Herzog, 2002; Speer, 2005; Ye & Levin, 2008). Studies of this type often use a questionnaire to assess beliefs both before and after classroom observations. Performance observations are then made of the teacher's classroom activities to assess alignment between stated beliefs and actual classroom practices. Some of these studies utilize standardized scoring, while some do not. An excellent example of this approach is provided by Roehrig, Turner, Grove, Schneider, and Liu (2009). Speer (2005) also discusses in detail the use of performance observations, including when to use them and how to record performance data using rubric and video-clips.

Self-reflective writing activities focus on an individual's perceptions of an experience and may include essays, journals, diaries, and logs. Guven (2004) used both structured interviews and essays to assess teachers' beliefs and the relationship between beliefs and practices. Essays were used to justify in more detail views and beliefs expressed during interviews. Because beliefs frequently change over time, but especially in classes where instruction is intended to impact student beliefs, journals and blogs are used frequently to capture evolving beliefs and reactions to instructional activities. For example, Crooks, Castelden, and Meervald (2010) used continuous journaling during a semester based on critical questions concerning reflective practice. Shoffner (2009) used a similar blogging strategy in which students kept an ongoing record of reflective practice and beliefs about how and why their instructional practice changed. Luehmann and Tinelli (2008) also used blogging to promote student reflection, as well as social networking in which students shared their reflections, to create a community of learners geared toward reform-based science practice in the classroom. Olafson, Schraw, Vanderveldt, and Ponder (2011) used web postings to target questions to promote belief change.

Tests and exams include off-the-shelf or researcher developed assessments of teaching skills and knowledge (e.g., Praxis exam), content knowledge (e.g., biology), general skills and achievement (e.g., metacognitive awareness), or cognitive ability (e.g., critical thinking). For example, the *California Critical Thinking Inventory* (Facione & Facione, 2007) has been used in a variety of studies of teacher thinking and problem solving and could be used easily in teachers' beliefs research. Other standardized tests of teaching skills might be used as well. Gallagher (2009) also found that teachers' beliefs were related to their understanding and responses to four types of questions from the Praxis exam. Torff (2005) and Izandinia (2012) reported that teacher's beliefs about instructional practice were related to beliefs about the importance of critical thinking skills, as well as the sophistication of these skills. Similarly, Meyer (2004) found that expert and novice teachers had differing beliefs about the role of student knowledge, where expert teachers are more likely to attribute student learning to prior knowledge and also make better use of students' prior knowledge. Sherman, Rasmussen, and Baydala (2008) concluded that teacher factors, including level of training and educational level, and their views about treatment acceptability, influence students' performance on specific tasks, their ADHD

symptoms, and their perceived social acceptance. Additionally, Hall and West (2011) reported that performance on the Praxis exam correlated positively with GPA, ACT scores, and teaching performance but were uncorrelated with a measure of emotional intelligence.

Vignettes refer to short hypothetical classroom situations or scenarios that individuals respond to in writing or by rating their agreement with the situation described in the vignette. Vignettes frequently are used in conjunction with questionnaires, interviews, and written essays (Mueller & Hindin, 2011; Speer, 2005). Olafson, Schraw, and Vanderveldt (2010) used three vignettes based on realist, contextualist, and relativist epistemologies to examine the relationship between teachers' beliefs and commitment to classroom practices. Coplan, Hughes, Bosacki, and Rose-Krasnor (2011) presented teachers with vignettes depicting hypothetical children displaying shy/quiet, exuberant/talkative, or average/typical behaviors in the classroom and asked to rate which they preferred. Teachers also responded to follow-up questions assessing their strategies and beliefs. Onchwari (2010) also used written vignettes to assess the extent to which preservice teachers were sensitive to and felt capable of handling student stress.

Scaled responses refer to ratings of the degree to which individuals agree with a belief or activity. Scaled responses usually span a continuum of possible beliefs, allowing the individual to select the belief he or she most agrees with. Although questionnaires typically use a rating scale of some type such as a five-point Likert scale, they do not manipulate the type of response scale to which the individual responds. Scaled responses have been used successfully in many types of social science and opinion research (Fowler, 2009), but have not been used extensively in teachers' beliefs research. One exception is the work of Bromme and colleagues (Bromme, Pieschl, & Stahl, 2010; Stahl & Bromme, 2007) who created a 24-item semantic differential instrument that measures connotative aspects of student's epistemological beliefs using bipolar adjective pairs that were subsumed under three hypothesized epistemological factors, including *certainty*, *simplicity*, and *source*. For example, certainty included the *certain-uncertain* pair; simplicity included the *simple-complex* pair; and the source factor included the *constructed-preexisting* pair. Two studies using university students enrolled in either plant biology or chemistry yielded two reliable factors referred to as *texture* and *variability*. Texture assessed the complexity and sophistication of beliefs, whereas variability assessed the changeability and permanence of beliefs. Schraw and Olafson (2008) developed the *Four Quadrant Scale*, which assessed epistemological and ontological world views using two axes at right angles to each other that range from realist to relativist on each axis. This yielded four quadrants, including realist-realist, realist-relativist, relativist-realist, or relativist-relativist. Individuals first read a brief summary of each quadrant and then selected a point in the four-quadrant array that best corresponded to their personal epistemological and ontological world views about teaching. This enabled participants to record the degree to which they endorsed realist versus relativist epistemological and ontological beliefs.

Portfolios refer to a collection of work that demonstrates achievement, effort, and growth over time. Portfolios may include a wide variety of documents such as reports, picture, test scores, letters from teachers, and awards (Stiggins, 2011). Portfolios are especially well-suited for giving teachers a purpose and framework for preserving and sharing their work and beliefs about teaching. For example, Hartmann (2004) used portfolios to provide mentoring and examine teacher's instructional strategies and

beliefs in a preservice mathematics methods course setting. Portfolios also may be a powerful tool for teacher reflection and change, and thus have been used in a variety of studies teachers' beliefs for this purpose. Khan and Begum (2012) provided a detailed model illustrating ways in which portfolios may be used to promote reflection and development, and assess beliefs. A number of recent studies have used electronic portfolios to investigate teachers' beliefs (Chou, 2012; Salisbury & Kymes, 2007). Many of these studies combined e-portfolios with other data collection strategies.

Visual representations refer to graphic displays, pictures, drawings, and representations such as concept maps that show the interrelationship among beliefs, or between beliefs and other salient concepts (Speer, 2005; Van Meter & Firetto, 2013). Schraw and Paik (2013) described eight different types of visual representations that can be used to understand learning, understanding, and beliefs. Martin (2008) used concept maps to assess teachers' understanding of geography by asking them to construct an integrated concept map using eight key geography concepts. Rush and Harrison (2008) sorted responses from high school teachers and aggregated them into a concept map regarding attitudes toward ADHD students. Chin and Teou (2010) used drawings and cartoons to examine students' and teachers' beliefs about biological inheritance. Hancock and Gallard (2004) used a combination of drawings and follow-up interviews to examine beliefs about preservice field-based teaching experiences.

Classroom artifacts refer to instructional and learning outcomes associated with classroom activities that may be accessible as secondary data to researchers, which provides evidence of classroom activities (Speer, 2005). These may include classroom and assessment materials such as lesson plans, curriculum master plans, attendance records, practice tests, learning center materials, laboratory and research log books, and student artwork (Parke, Lane & Stone, 2006). A subset of these artifacts may be assembled to argue that curriculum, pedagogy, and learning are aligned effectively (Waight & Abd-El-Khalick, 2011). Multiple measures also may be used collectively to promote triangulation and the creation of an evidence-based validity argument (McMullen et al., 2006; Parke et al., 2006).

We conclude this section by noting that many of the 10 strategies described above may be combined in innovative ways to meet the specific goals of the researchers. For example, Gill and Hoffman (2009) used a think-aloud method to capture teachers' talk during shared planning time in order to better understand the thinking that supports curricular and pedagogical decisions made in the classroom. Discourse was analyzed into six categories of teacher strategic behavior. This approach illustrated the use of several of the strategies described above in a hybrid manner, including verbal reports (i.e., thinking aloud), performance observations of teachers' classroom activities, self- and other-reflection on those activities, and the use of instructional and classroom artifacts.

VALIDITY CHALLENGES AND THEIR SOLUTION

Validity refers to a judgment of the degree to which evidence and theory support the appropriateness of an inference made from an assessment (Messick, 1989). Validity is the *raison d'être* of an assessment because lack of validity precludes the use of the assessment to make inferences about the construct of interest (Kane, 2004). Many factors affect the validity of the inferences and conclusions that researchers draw about the constructs and theoretical models.

Fortunately, validity can be improved greatly through the use of a systematic validation process as the five-stage validation model shown in Table 6.2 that is modeled after the central tenets of contemporary validity theory (Kane, 2004; Messick, 1989; Shadish, Cook & Campbell, 2002; Zumbo, 2007). The five stages of the model correspond to defining the construct, designing the scale, conducting a pilot test, analyzing the revised instrument, and validating and norming the results. Two recent validation studies illustrate this process from beginning to end and provide excellent examples for the interested reader (Kucsera et al., 2011; Usher & Pajares, 2008).

Stage one focuses on defining constructs, which includes three component steps described in detail by DeVellis (2003). The purpose of defining constructs is to clarify the to-be-measured phenomena prior to instrument development by identifying the constructs of interest, providing detailed operational definitions of the constructs, and articulating a theoretical framework that specifies the relationship among constructs and how each of these constructs is related to other variables of

Table 6.2 Five-Stage Validation Model

Stage	Validation Activity	Purpose
Define Construct(s)	Identify constructs.	Establish the dimensionality of instrument.
	Operational definitions.	Name and define individual constructs being assessed.
	Theoretical framework.	Explain relationships among primary constructs.
Design the Assessment	Select format.	Determine how to collect data.
	Construct item pool.	Assess full range of construct meanings.
	Winnow item pool.	Select comprehensive subset of items.
	Design the scale.	Decide how participants will respond to items.
	Create scoring rubric.	Score items reliably.
Pilot Test the Assessment	Collect and analyze pilot data.	Use data to make evidence-based decisions.
	Revise instrument.	Use data to eliminate items or scales.
Administration and Analyze Results	Collect data.	Use data to make evidence-based decisions.
	Conduct factor analysis.	Evaluate factor structure.
	Final revisions.	Eliminate items or scales.
Validate and Norm Results	Content validity.	Assess all essential content.
	Reliability.	Assess the dependability of assessments.
	Construct validity (test via CFA).	Evaluate accuracy of theoretically specified factors.
	Criterion validity (convergent and divergent evidence).	Evaluate predicated relationship to other relevant variables.
	Integrated validity argument.	Use collective evidence to justify inferences.

interest. Construct definition typically utilizes information based on a thorough literature review, analysis of similar instruments, and focus groups using experts in the field.

Kucsera et al. (2011) defined constructs in two important ways in the development of the GOTT. The first was to review the goal orientation literature over the past 25 years and define the learning and performance goal orientations proposed by Dweck and Leggett (1988). Second, they carefully defined the learning, proving, and avoiding scales that comprised the GOTT and discussed how they related to the work of Dweck and Leggett (1988), as well as evolving goal orientation theory. In addition, Kucsera et al. (2011) also provided succinct operational definitions of each psychological construct measured by each scale and made specific predictions about the relationship between these constructs based on the theoretical framework that guided the research.

Stage two consists of designing the assessment. This includes selecting the format of the assessment, which may include questionnaire items, multiple-choice or fill-in-the-blank test questions, structured interviews, or strategies described in more detail below. Format decisions should reflect the main purpose of the assessment. A second step is to construct items, usually by consulting an existing theoretical literature, similar types of assessments that one might use as a template, or through data from focus groups (Fowler, 2009). We suggest a large initial pool that can be winnowed and revised by the research team during step three. Step three includes four activities designed to codify the assessment scale and data-collection conditions (Fowler, 2009; Speer, 2005). One is to select an appropriate scale such as a five-point Likert scale or a semantic differential scale that standardizes how results are recorded across respondents. A second is to establish rules and guidelines for assessment items such as standardized length and wording. A third is to codify written instructions used during data collection. A fourth is to establish a standardized data collection protocol that can be used across a variety of times and settings. Last, the research team should create scoring rubrics that can be used to train judges to score subjective data in a reliable fashion.

Stage three consists of pilot test activities in which the researcher collects preliminary data that can be used to assess the quality of individual assessment items. Pilot tests usually include data from 20 to 30 representative participants based on the assessment itself as well as verbal reports about the assessment if these data can be collected (DeVellis, 2003). The purpose of this data is to assure that individual items are not too easy or difficult, the full response scale is used, the assessment can be completed in the allotted time, and there is no evidence that items were confusing or ambiguous. Although samples typically are small, reliability data can be used to assess the feasibility of individual items. Items with low reliability coefficients (i.e., $< .70$) can be revised or deleted from the assessment. As a general rule, each construct should include a minimum of five responses to assure adequate reliability and sufficient range of scores (e.g., 0–10) that enable the researcher to discriminate between high and low scorers on the construct.

The GOTT was piloted and validated in three different ways consistent with best practices. The first was to ask a panel of experts to review items, operational definitions, and the description of the guiding theory. This helped to codify materials and definitions before collecting data. The second step was to pilot the developed

instrument. Kucsera et al. (2011) collected pilot data from 186 participants in Phase II of their study to conduct an exploratory factor-analysis solution of the GOTT. The purpose of this phase was to implement a data-driven evaluation of the data to assess whether the three-structure structure was credible and that the items on each of the three scales yielded reliable scores. Phase III used 291 comparable participants in a cross-validation study to verify the structure and scale reliability of the GOTT.

Stage four includes a replication of the results after the initial assessment has been piloted and revised. Typically, the full administration and analysis of the instrument includes a large, representative sample of at least 100 people. The full administration may include small changes to the initial testing or be identical in as in Phase III of the Kucsera et al. (2011) study. A statistical analysis of data also takes place, frequently using a theoretically driven factor analysis to determine whether the number of hypothesized constructs and their predicted relationships are supported empirically (Tabachnick & Fidell, 2001). Final revisions maybe made based on the full administration, or if the results are consistent with predicted results, the research may proceed to stage five in which technical validation data is analyzed. Phase II of the GOTT validation study illustrates this process clearly.

Stage five of the validation process typically incorporates statistical analyses, although it is frequently the case that qualitative analyses are used as well (Kane, 2004; Zumbo, 2007). From a statistical perspective, validation of attitude and belief scales should include an analysis of reliability, factor structure, and the correlational relationship between key constructs and related variables of interest. Statistical procedures for doing so may be found in a variety of texts (DeVellis, 2003; Tabachnick & Fidell, 2001). The researcher should provide evidence in support of five aspects of the assessment, including relevant content, reliability of tests or scales, factor structure, criterion validity, and an integrated validity argument that addresses the theoretical framework used to develop and construct the assessment.

Within stage five, content validity refers to checks to assure that relevant content has been sampled and assessed. This is often done by using a test blueprint, alignment to relevant standards, or review by a panel of experts (Osterlind, 2010). An alignment study asks experts to judge whether all the appropriate content has been sampled in the assessments. The purpose of this review is to assure that the assessments sample all of the critical content specified in operational definitions or standards, or a specified curriculum. Pellegrino and Chudowsky (2003) describe a variety of ways in which researchers may align assessment items to salient content they wish to measure in order to assure sufficient coverage of the constructs measured by the instrument.

Reliability refers to the consistency of responses, where higher consistency suggests that the assessment provides a dependable measure of the construct. Reliability may be assessed in a variety of ways depending upon the form of the assessment and the objectivity of responses (Labone, 2004; Osterlind, 2010). Reliability should be above the .70 criterion at a minimum. It is common practice to drop or revise items based on poor item-to-construct correlations when comparing the reliability of pilot data. Kucsera et al. (2011) discuss reliability and provide reliability coefficients on pages 602 and 605 for Phases II and II of their study.

A test of the factor structure of the assessments is especially important to assure that each instrument measures the predicted number and type of constructs it claims to measure (Shadish et al., 2002). For example, an instrument that claims to measure two types of teacher self-efficacy should yield two factors that may be inter-correlated (Goddard et al., 2000; Woolfolk-Hoy et al., 2006). Exploratory factor analysis is used frequently to assess the number of emergent constructs (Tabachnick & Fidell, 2001). Kucsera et al. (2011) report the findings of their exploratory analysis on page 602 of their study. Confirmatory factor analysis (CFA) is used even more frequently because it provides a goodness of fit test between the predicted and observed results. Confirmatory models are preferred because they specify in advance the number of constructs being evaluated and the statistical relationship between these constructs. Kucsera et al. (2011) report the findings of their confirmatory analysis in Phase III of their study on pages 604–605. It is important to bear in mind that even frequently used constructs and corresponding instruments need conceptual and methodological revisions based on ongoing CFA data and theoretical advances (Labone, 2004; Zumbo, 2007).

Kucsera et al. (2011) also provided goodness-of-fit statistics in Table 2 on page 605. They compared one-, two-, and three-factor solutions to determine whether their hypothesized three-factor solution provided the best fitting model. This model comparison procedure enables researchers to identify the best-fit model using standard model fitting statistics (Bentler, 2005; Byrne, 2006; Tabachnick & Fidell, 2001).

CFA models may be used as well to assess the criterion validity of assessments, in which the main constructs of interest (e.g., learning, proving, and avoiding scales) are correlated with other variables of interest such as student education, age, gender, achievement, and cognitive ability. For example, teacher self-efficacy scores may be correlated positively with student achievement, teacher satisfaction, or collective school efficacy (Goddard et al., 2000). Criterion validity studies usually make predictions about the convergent (i.e., positive relationships) and discriminant (i.e., negative relationships) between the main constructs and other variables of interest. For example, Kucsera et al. (2011) predicted that the learning scale on the GOTT would be positively correlated with teacher self-efficacy and teacher impact, while the proving scale would be negatively correlated with teacher self-efficacy. These relationships were confirmed, supporting the claim that the learning and proving scales are related to other salient teacher variables in different ways.

GENERAL PRINCIPLES FOR IMPROVING ASSESSMENTS

We believe that researchers may assess teachers' beliefs in a reliable, valid, and theoretically clear manner provided they plan, design, select, and implement assessment strategies wisely. We summarized 10 general assessment strategies that may be used separately or in combination in a manner that best suits the researcher's purposes. We also provided a five-stage sequence to assure best design and implementation practices. We close this chapter by stressing five general principles for conducting theoretically and methodologically credible studies.

The first is to begin with a clear theoretical framework that identifies the main constructs of interest, provides unambiguous definitions, and outlines the

hypothesized relationships among key variable in the framework. Ideally, researchers should indicate whether the goal of the study is to examine the quality of assessment instruments, test some aspect of the theoretical framework, focus on relationships between targeted constructs and hypothesized outcomes, or all of these goals. Usher and Pajares (2008) and Goddard et al. (2000) provide excellent working examples of the use of theory to guide instrument development.

A second principle is to develop a systematic evaluation plan that guides the conceptualization, development, implementation, and evaluation of assessment instruments. Table 6.2 lists the main steps in a five-stage plan whose goals are to help the researcher develop instruments that assess the constructs of interest in a clear fashion, construct and revise prototypes, and collect data that provides evidence of reliability and overall validity. This plan should describe the quantitative and qualitative data analysis techniques used to evaluate the assessment instruments and justify a validity argument. Table 6.2 includes 18 discrete activities that may play a role in the instrument development process. Although not all 18 steps are necessary, researchers should complete as many of these steps as are feasible to assure the best measurement practices possible.

Principle three is to use a variety of assessment tools to triangulate findings Moyer-Packenham et al. (2008). A number of the studies cited in this chapter use two or more strategies that provide different types of data and perspectives on teachers' beliefs and the relationship between beliefs and teaching outcomes (Scheetz & Martin, 2006; Speer, 2005). Multiple assessments enable researchers to examine teachers' beliefs at a broader and deeper level (Kane, 2004; Pellegrino & Chudowsky, 2003; Shadish et al., 2002). A variety of previously unused methodologies could be employed as well such as Q-sorts (La Paro, Siepak, & Scott-Little, 2009; Rimm-Kaufman & Sawyer, 2004) in which teachers prioritized beliefs, and beeper studies (Punzo & Miller, 2002) where individuals are stopped while engaged in real-time activities in order to report beliefs and ongoing measurable activities. We also believe that a combination of quantitative and qualitative assessments is optimal, especially when quantitative measures such as questionnaires are used to assess beliefs and qualitative measures such as interviews are used to examine the origin and development of beliefs in greater detail.

A fourth principle is to focus on the measurement integrity of assessments. Researchers may do so by situating constructs within the theory of interest, constructing assessments that provide scale scores that are related closely to the construct of interest, and provide a sensitive composite score that is able to detect change in the belief over time. These scores should be both reliable and valid. Fowler (2009), Osterlind (2010), Stiggins (2011), and Pellegrino and Chudowsky (2003) provide guidelines for constructing effective instruments and for assessing the degree to which they meet minimum standards for reliable and valid assessments.

Principle five is to design theoretically motivated instruments in a manner that enables the researcher to present a convincing validity argument (Kane, 2004; Messick, 1989; Osterlind, 2010; Zumbo, 2007). The validity argument should justify the quality of the individual instruments used in the study, the relationship between variables of interest, and claims in support of the theory. Kane (2004) and Zumbo (2007) provide criteria for constructing an integrated validity argument.

Principle five also highlights the importance of triangulation of empirical findings in a theoretically consistent pattern. The best way to do so in our opinion is to

make specific predictions about the relationships between the constructs of interest (e.g., learning, proving, and avoiding), as well as salient criterion outcomes these constructs are used to predict. Table 5 in Kucsera et al. (2011) illustrated the triangulation of variables using observed correlations. Ideally, variables such as the learning and proving scales on the GOTT should be correlated negatively with one another and exhibit different and theoretically consistent relationships to other outcomes such as teacher self-efficacy. Triangulation is essential in order to establish the validity of the construct measured by the instrument, but also to demonstrate a larger meaningful pattern of results that is consistent within the theory that was used to develop the instrument and operationally define the constructs of interest.

SUMMARY

This chapter considered challenges and solutions when assessing teachers' beliefs. This task may seem daunting at first because researchers typically are more interested in the content of beliefs than the measurement process used to assess beliefs. We proposed that researchers begin by clarifying the four conceptual challenges discussed in section two of this chapter. This focuses on the development of a well-articulated theoretical framework that specifies the dimensionality and interrelationships of the constructs being assessed. Section three discussed 10 different assessment strategies that have been used previously in the teachers' beliefs research literature. We recommended using as many of these strategies as are feasible in order to triangulate outcomes. Section four provided a comprehensive five-stage sequence to plan, construct, and evaluate the quality of assessments. We also provided five general principles to serve as solutions to the assessment challenges described in this chapter. Using the strategies in Table 6.1 and following the plan in Table 6.2 should enable research teams to assess beliefs using a variety of different assessment in a reliable and valid fashion.

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7

MEASURING TEACHERS' BELIEFS

For What Purpose?

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Teachers' beliefs have been described as a “particularly provocative form of personal knowledge” (Kagan, 1992, p. 65). For teachers, beliefs serve as an epistemological base, or a theoretical underpinning, orchestrating cognitive, affective, and behavioral decisions that manifest in the classroom. Teachers' beliefs are widely acknowledged to influence instructional choices and teaching practices, and potentially determine when, why, and how teachers interact with students. From a situated perspective, certain beliefs are related to teaching dispositions that promote superior motivation and learning outcomes for students (Collie, Shapka, & Perry, 2012; De Corte, Vershaffel, & Depaepe, 2008; Muis & Foy, 2010; Pečjak, & Košir, 2004, 2008). The precise measurement of beliefs is a prerequisite to help teachers understand how beliefs can influence superior learning outcomes via adaptive and constructive pedagogy.

The primary objective of this chapter is to provide a comprehensive and objective review of the methods and resources that reliably and accurately measure teachers' beliefs. Although a review of every belief measure is beyond the scope of the current work, there was a deliberate focus on identifying belief measures found related to effective teaching or learning, as most teacher education programs operate under the supposition that the enactment of certain defined beliefs are positively related to expert teaching (Tatto & Coupland, 2003). The findings in this review should enable researchers, practitioners, and graduate students to select, administer, and evaluate a variety of measures.

SCOPE OF THE REVIEW

For the purposes of this review, teachers' beliefs are distinct and measurable, transcending individual propositions, which are interpreted through “collective understanding” of the human condition (Pajares, 1992, p. 316), exclude ideological positions,

such as those grounded in sociological theory (Gates, 2006), and supersede dispositions that fluctuate according to specific contextual conditions (Tatto & Coupland, 2003). Instead, we emphasized the measurement of durable, stable beliefs, such as those regarding students, the nature of pedagogy, and the learning context. Measures included were empirically substantiated through psychometric scrutiny and considered to be reliable and valid representations of teacher cognition.

Reliable measures are those found to show measurement consistency over multiple administrations of an instrument, or when using alternate and parallel forms of the same instrument. For this review, a measure was considered reliable if tests of stability, equivalence, or internal consistency yielded reliability coefficients $> .70$. Qualitative measures were considered reliable if adequate inter-rater reliability was reported. Measures with evidence of validity are those deemed suitable for making theoretical inferences or evaluative interpretations of numerical scores (AERA, APA, & NCME, 1999; Messick, 1989). Sources of validity evidence were evaluated through examination of instrument content, the reported internal structure of test items, and indices of convergent, discriminate, or covariance evidence.

Empirical consensus (see Fives & Buehl, 2012, for a review) reveals beliefs may influence teacher behavior in at least three ways: by filtering how teachers and teacher candidates process and evaluate content in education and professional development programs, through influence on how teachers approach and respond to educational challenges, and by determination of the subsequent actions teachers take in the classroom to cultivate productive educational climates and achievement. Although empirical research showing causal connections between specific beliefs and superior learning or motivational outcomes are indeed inconsistent and tenuous, recent studies have shown promising relationships between what teachers believe and the nature of their pedagogical practice, which ultimately may influence student achievement outcomes (Depaepe, De Corte, & Verschaffel, 2010; Muis & Duffy, 2012; Muis & Foy, 2010; Sakiz, Pape, & Hoy, 2012; Yadav & Koehler, 2007). Thus, in addition to reviewing belief measures, this chapter focuses on identifying what measures may assist teachers in recording, measuring, evaluating, and analyzing their own beliefs as a conduit to promoting academically productive teaching strategies.

DATA ANALYSIS METHODS

How Were Measures Selected?

For this review, only measures that were applicable to assess the beliefs of learners enrolled in preservice teacher education programs or practicing K-12 teachers were included. Measurements of “attitudes” and “belief generating experiences” were excluded as these constructs, although related to the formation of belief structures, lack stability and are more transient due to the affective nature of attitude generation (Tatto & Coupland, 2003).

The search process employed the Ebscohost search engine incorporating the PsycINFO, PsycARTICLES, ERIC, Mental Measurements Yearbook, and Education Full Text (H.W. Wilson) databases. The initial keywords of “teacher beliefs” and “measures or measurement” yielded 2,127 results published within the past 25 years.

The results were narrowed to only include peer-reviewed articles providing a full text link. The filtering process resulted in 913 potential publications. The search was further restricted to studies that broadly measured teachers' beliefs pursuant to the categorization paradigm developed by Fives and Buehl (2012). The five categories explained in detail below included beliefs concerning the self, the context or environment of teaching, content knowledge, specific teaching practices and approaches, and beliefs about students. Additional searches were conducted using the terms "teacher beliefs" and "student achievement," "learning outcomes," "motivation," and "performance." After eliminating redundancies, 345 studies were examined, of which 95 are highlighted in this chapter. Studies excluded for consideration were manuscripts that primarily focused on the beliefs of students, were ancillary to the measurement of beliefs, or lacked methodological rigor due to small sample sizes or insufficient psychometric evidence.

Paradigms of Measurement

Teachers' beliefs are purported to be measured in at least 10 ways (see Schraw & Olafson, Chapter 6, this volume). Collecting data on teachers' beliefs is generally completed using two primary methods: through self-reported descriptions of psychological phenomena purported to influence teaching and learning, or by observations of teacher behavior and associated exemplars of instruction. Self-report, the most frequent approach used to measure beliefs, includes methodologies such as questionnaires and verbal reports. Self-report mechanisms attempt to describe or quantify beliefs and the cognitive underpinnings that guide learning and instruction. Observation involves the collection and review of teaching or learning artifacts that purport to represent the manifestation of beliefs. Observation exemplars include performance observations, analysis of self-reflective writing or tests, reviews of teaching portfolios, visual representations, and instructional and classroom artifacts.

Data garnered from belief measures should be subjected to quantitative or qualitative analysis. The objective of quantitative interpretation is to draw logical inferences from numerical scores, such as when evaluating the correlation among variables assumed to be related to certain beliefs (e.g., Hudson, Kloosterman, & Galindo, 2012), when making effect-size comparisons between control and experimental groups as a result of a belief-changing intervention (e.g., Rethlefsen & Park, 2011), or when assessing longitudinal change in beliefs across individuals (e.g., Da-Silva, Mellado, Ruiz, & Porlan, 2007). Typically, quantitative analysis results in the development of statistical models used to evaluate the nature of group differences or identify patterns that allow researchers to articulate theoretical models of belief formation, progress, and potency.

Qualitative analyses seek to assess the meanings and logical etiology of teaching behaviors. Analysis can be conducted at the program, classroom, or teacher/student level (Tatto & Coupland, 2003). These measures include verbal reports, performance observations, self-reflective writing, portfolios, and analysis of classroom artifacts (Bullough, Chapter 9, this volume; Schraw & Olafson, Chapter 6, this volume). Qualitative approaches are well suited to understand the nature of teachers' thinking and their world-views, yet are not predictive in nature (Richardson, 1996). For

example, qualitative interpretations allow for a deeper understanding as to how beliefs manifest in pedagogical practice such as constructivist teaching (Gill & Hoffman, 2009), and to understand how teachers reflect on the use of teaching strategies and the results of their teaching (Kyles & Olafson, 2008; Irez, 2007).

Frequently, data from teachers' beliefs measures emphasize "outcomes" (Tatto & Coupland, 2003, p. 156). Analysis of beliefs almost exclusively presumes externally driven quantification or rich description of conscious experience, despite the introspective and often repressed nature of beliefs. Regrettably, a dilemma exists as incongruence between self-reported espoused beliefs and demonstrated enacted beliefs as evidenced by teaching practice are quite common (Fives & Buehl, 2012; Woolfolk Hoy, Davis, & Pape, 2006). The tacit nature of beliefs may predispose practitioners to underestimate the influence of beliefs on practice (Tang, Lee, & Chun, 2012), or may result in reported misconceptions concerning beliefs (Porlan & Del Pozo, 2004). Precise measurement of beliefs is complicated by social bias, as individual beliefs may conflict with mandated curriculum (Thomas, Pederson, & Finson, 2001), and even the most objective practitioners may not consciously recognize their own beliefs during teaching (Gill & Hoffman, 2009).

How Were Chapter Beliefs Framed?

Belief measures were predominantly framed according to an expanded categorization structure articulated by Fives and Buehl (2012). This structure was chosen, in part, based upon the objective of maintaining historical consistency in the way beliefs have been described and categorized over the past 25 years. This classification was guided by the seminal work of Pajares (1992) and the subsequent reviews by Kagan (1992), Richardson (1996), and Tatto and Coupland (2003), which substantiates the belief categories selected for Tables 7.1–7.5.

Measuring beliefs about self. Questionnaires measuring domain-specific self-efficacy or personal epistemology dominate self-belief measurement (see Table 7.1). Self-efficacy, the belief in successfully executing courses of action (Bandura, 1997), strongly influences perceptions of teaching ability (Siwatu & Chesnut, Chapter 12, this volume; Garcia, 2004). However, at the classroom level, teachers' sense of efficacy, the belief that teachers can positively influence learning outcomes (Tschannen-Moran & Woolfolk Hoy, 2001), has since emerged as a distinct and measurable construct (e.g., De La Torre Cruz & Casanova Arias, 2007). The most commonly used instruments to assess teacher self-efficacy are Gibson and Dembo's (1984) Teacher Efficacy Scale (TES; see Denzine, Cooney, & McKenzie, 2005, for a critique of this tool), which measures general and personal teaching efficacy, and Tschannen-Moran and Woolfolk Hoy's (2001) Teachers' Sense of Efficacy Scale, used to measure self-efficacy for instructional strategies, classroom management, and student engagement.

Epistemological beliefs concern the nature and process of knowledge acquisition (Hofer & Pintrich, 1997; Lunn, Walker, & Mascadri, Chapter 18, this volume) and are often measured along the dimensions of the organization, certainty, and source of knowledge, and the control and speed of learning using Schraw, Benedixen, and Dunkle's (2002) Epistemological Beliefs Inventory (EBI) and Kardash and Wood's (2000) Epistemological Beliefs Survey (EBS). Precise measurement of epistemological

Table 7.1 Representative Sample of Self-belief Measures

Constructs Measured	Name/Type of Measure	Empirical Examples	Psychometric Evidence	Potential Usage/Comments
Epistemic cognition in teaching history	Beliefs about Learning & Teaching History Questionnaire	(Maggioni, Van Sledright, & Alexander, 2009)	Exploratory and confirmatory factor analysis, two-factor principal component analysis	Developed an instrument to monitor changes in epistemic cognition across large samples.
Epistemological beliefs	Epistemological Beliefs Questionnaire (EBQ) Questionnaire	(Chai, Khine, & Teo, 2006)	Factor analysis, internal consistency	Evaluated effect of demographics on personal epistemology among preservice teachers in Singapore.
Teacher self-efficacy in relating to students and colleagues	Teacher Interpersonal Self-Efficacy Scale Questionnaire	(Brouwers & Tomic, 2001)	Confirmatory factor analysis	Demonstrated that the instrument's three subscales measured distinct activities related to teacher self-efficacy beliefs.
Self-efficacy to teach science to diverse learners	Self-Efficacy Beliefs about Equitable Science Teaching (SEBEST) Questionnaire	(Ritter, Boone, & Rubba, 2001)	Content analysis, factor analysis	Added an additional dimension to similar instruments by including diverse learners.
Teacher self-efficacy	Teacher Efficacy Scale (TES) Questionnaire	(Denzine, Cooney, & McKenzie, 2005)	Confirmatory factor analysis	Evaluated validity of factors measured by the TES, including the dimension of locus of causality.

beliefs is important in the classroom as these types of beliefs are linked to both the curricular and instructional choices of teachers (White, 2000).

Some methods of evaluating self-beliefs deviate from exclusive self-report by combining questionnaires with qualitative assessments, or by using innovative analysis techniques to determine the relation between beliefs and instructional practice. Brownlee, Petriwskyj, Thorpe, Stacey, and Gibson (2011) determined the effects of an integrated teaching program on preservice teachers' epistemological beliefs using pre- and post-course results from the EBS and information from self-reflective

writing to measure changes in epistemic beliefs across semesters. To evaluate the effectiveness of specific teaching methods on teacher efficacy, Rethlefsen and Park (2011) compared scores on the Mathematics Teaching Efficacy Beliefs Instrument (MTEBI) in conjunction with open-ended course evaluative questions to determine that specific training practices such as vicarious modeling and deliberate reflection positively impact teacher self-efficacy. Heikkila, Lonka, Nieminen, and Niemivirta (2012) employed latent-class clustering to develop cognitive and affective profiles of preservice teachers. The profiling approach was useful to conclude that self-directed teacher candidates had far less stress related to teaching and reported an accelerated sense of overall well-being. Collectively, these variable self-belief measures provide strong validity evidence that the worldviews of teachers serve a mediating role influencing the nature, quality, and style of instructional practice.

Measuring beliefs about context and environment. Beliefs about the teaching context and instructional environment fall into two broad categories. Measures are primarily used to examine culturally relevant beliefs related to teaching practice with an emphasis on multi-national pedagogical comparisons, or the evaluation of systemic beliefs such as the collective efficacy of teachers (see Rubie-Davies, Chapter 15, Tschannen-Moran et al., Chapter 17, this volume). Many contextual studies control for variables such as teacher background, school curriculum, and district-wide administrative practices in an attempt to discern the relative influence on individual and collective beliefs.

The most common method used to assess contextual beliefs is self-report questionnaires, although some researchers employ qualitative approaches (see Table 7.2). Predominately measures in this category of beliefs seek evidence of concurrent validity or assess construct correlation through clear identification of instrument factor structures. Considering the overt nature of context and environmental influences such as student behavior, school culture, and apparent demographic differences across cultures, this category of beliefs provides opportunities for simplicity of study design. Context measures are ideal for researchers to examine belief differences across cultures as effect size differences serve as means to validate belief variability among groups.

One novel methodology used to assess the classroom perceptions of early childhood preservice teachers is the Draw-An-Environment Test Rubric (DAET-R, Moseley, Desjean-Perrotta, & Utley, 2010). The DAET-R method requires participants to illustrate classroom perceptions using drawings as a visual representation of environmental beliefs. Drawings are analyzed using a four-factor approach consisting of the role of humans, other living organisms (biotic), physical environment (abiotic), and conceptions of the environment based upon the definitions drafted by the North American Association of Environmental Education Guidelines, a professional development organization for preservice teachers. Analysis of results revealed that the DAET-R allows for the collection of reliable data about preservice teachers' mental models and provided predictive evidence that contextualized beliefs influence classroom practice.

Specific relations between certain contextual beliefs and learning outcomes were observed by Love and Kruger (2005), who modified a questionnaire (Ladson-Billings, 1994) and sampled K-5 teachers and administrators concerning their culturally relevant beliefs and teaching practices related to communalism, student cooperation,

Table 7.2 Representative Sample of Context and Environment Measures

Constructs Measured	Name/Type of Measure	Empirical Examples	Psychometric Evidence	Potential Usage/ Comments
Classroom management	The Behavior and Instructional Management Scale (BIMS) – Questionnaire	(Martin & Sass, 2010)	Factor analysis, concurrent validity with the OTES	Examined beliefs about play, discipline, and the relation between behavior management and instruction.
Collective efficacy	Collective Teacher Sense of Efficacy Scale (CTEBS) – Questionnaire	(Tschannen-Moran & Barr, 2004)	Content review, factor analysis, reliability	Demonstrated that collective sense of teacher efficacy was related to middle-school achievement, and independent of SES.
	Teachers Collective Efficacy scale (TCE) – Questionnaire	(Klassen, 2010)	Factor analysis, structural modeling	Concluded that teacher's sense of collective efficacy may lower feelings of stress towards student behavior.
Cross cultural comparison	Early Childhood Classroom Observation Measure (ECCOM) – (Stipek & Byler, 2005) – Questionnaire	(Lerkkanen et al., 2012)	Factor analysis, criterion validity	Validated instrument with a Finnish/Estonian sample previously validated with a North American sample.
	What do You Think of Creativity Scale – Questionnaire	(Seng, Keung, & Cheng, 2008)	Factor analysis, internal consistency	Identified five dimensions of creativity while contrasting beliefs between Asian samples.
	Reflective response letters – Self-reflective writing; Motivation for Teaching Scale – Questionnaire	(Kyles & Olafson, 2008)	Content analysis	Emphasized the tacit nature of multicultural beliefs and supported the notion that multiple measurements are warranted for reliable inferences.
Grouping or inclusion	Semi-structured interviews; questionnaires	(Ben-Yehuda, Leyser, & Last, 2010)	Member checking, Fisher's test of significance between groups	Measured pedagogical orientation (student/parent relationships), attitude toward inclusion, and daily practices.
School policy/ decision making	Public School Teacher questionnaire (TQ)	(Ware & Kitsantas, 2007)	Factor analysis	Used a sample of 26,257 teachers and determined specific beliefs are related to teacher commitment.

community relations, views on urban education, and the importance of race when instructing primarily African American and Hispanic children. Results from the belief measure were correlated with reading, mathematics, and the languages arts subscale scores on the standardized Iowa Test of Basic Skills, suggesting that teachers who described themselves as altruistic knowledge disseminators, those who had a strong give back to the community focus, and those who believed in universal student success were positively correlated with achievement outcomes.

Measuring beliefs about content or knowledge. The measurement of beliefs concerning content are dominated by beliefs about science and mathematics knowledge, and span a broad range of subject matter, incorporating a large number of studies (33; see Table 7.3). Beliefs about science knowledge shape curricular decisions (Stolberg, 2007) and can potentially influence accurate student conceptions about the nature of science (Lombardi & Sinatra, 2013). Measures exist that assess beliefs about *what* topics should be taught (Jenkins, 2009), as well as the appropriate methods to teach science concepts, with a strong emphasis on assessing the degree of inquiry instruction (Smolleck & Yoder, 2008). As is customary, most content measures are surveys, with content and response process validity evidence supporting their use, including the popular assessments of self-efficacy for teaching science, the Science Teaching Efficacy Beliefs Inventory (STEBI; Riggs & Enochs, 1990) and the updated STEBI-B (Bleicher, 2004).

Irez (2007) used a reflection-oriented approach to measure beliefs about the nature of science and conceptualizations of science education. This method involved two-staged interviews; the first stage generated researcher-developed cognitive maps of participants' responses to closed-end questions about the scientific method and the nature of science, while the second interview asked participants to reflect on the researcher maps to determine reliability and accuracy of responses. The trustworthiness of the reflection process was verified through qualitative member checking providing validity evidence that reflective techniques with cognitive mapping were an accurate measure of underlying teachers' beliefs structures.

Measuring teachers' beliefs about mathematics content and teachers' efficacy to teach mathematics is of critical importance, as teachers who believe they possess knowledge and comfort when teaching mathematics strongly influence students' positive perceptions of their own ability to learn mathematics (Kalder & Lesik, 2011; Midgeley, Feldlaufer, & Eccles, 1989; Relich, 1996). One novel approach that limits the liabilities of self-report is the assessment of teaching scenarios (Ambrose, Clement, Philipp, & Chauvot, 2004). The scenario approach attempts to overcome the introspective nature of beliefs and avoid the forced choice interpretation of Likert scale surveys. The method asks respondents to indicate open-ended positive or negative comments and reactions to video-taped classroom learning segments (see Bullough, Chapter 9, this volume). Researchers then infer meaning to response patterns, based upon evidence of consistencies and conflicts regarding belief enactment, instead of trying to determine belief etiology.

Although limited in number, some content measures foster data interpretations that imply direct relationships between content beliefs and student learning outcomes (De Corte, Verschaffel, & Depaeppe, 2008; Pečjak & Košir, 2004; 2008). Using interviews and observations regarding the application of metacognitive strategies to

Table 7.3 Representative Sample of Content and Knowledge Belief Measures

Constructs Measured	Name/Type of Measure	Empirical Examples	Psychometric Evidence	Potential Usage/ Comments
Language learning ability	Beliefs about Language Learning Inventory (BALLI) – Questionnaire	(Horwitz, 1988)	Content review, convergent validity	Measured how beliefs about language learning impact instruction.
Mathematics instruction	Unnamed instrument that used scenarios and scoring rubrics	(Ambrose, Clement, Philipp, & Chauvot, 2004)	Content review, response analysis	Assessed belief change in prospective teachers concerning methods used to teach mathematics.
Models of mathematics and science teaching	Confidence, Commitment, Collaboration, and Student thinking in Mathematics and Science (CCCSMS) – Questionnaire	(Hudson, Kloosterman, & Galindo, 2012)	Internal consistency, content evidence of parallel items in mathematics and science	Indicated despite a significant correlation between beliefs about mathematics and science teaching, belief disparities exist.
Orientation towards writing	Writing Orientation Scale – Questionnaire	(Graham, Harris, & MacArthur, 2002)	Construct validation; factor analysis	Revealed a three-factor structure of explicit instruction, correctness in students' writing, and natural learning methods are influenced by beliefs.
Pseudo-scientific beliefs	NSF Surveys of Public Understanding of Science and Technology	(Losh & Nzekwe, 2011)	Content evidence, concurrent validity	Determined that the pseudo-scientific beliefs of future teachers were similar to the typical adult population.
Readiness to teach content	BeTeBaS instrument (BEGinning TEachers–BASic Skills) – Questionnaire	(Elke, Adriaensens, & Meynen, 2011)	Construct validation, factor analysis	Determined that behavior, capability, and beliefs are instrumental in teacher readiness.
Reading motivation, sense of efficacy to teach reading	Teachers– Beliefs About Students – Motivation For Reading – Questionnaire (based on the Motivation to Read inventory; Wigfield, Guthrie, & McGough, 1996)	(Quirk et al., 2010)	Internal consistency, content validation, concurrent validity	Confirmed a strong positive relationship between beliefs about student motivation to read and teaching sense of self-efficacy.
Teaching science through inquiry instruction	Teaching Science as Inquiry (TSI) Instrument – Questionnaire	(Smolleck & Yoder, 2008)	Content analysis, construct validity, internal consistency	Showed strong positive correlations between outcome beliefs and instruction

solve problems, De Corte et al. (2008) concluded teachers who believed in and used stronger metacognitive and heuristic models of problem solving accelerated student performance, while Pečjak and Košir (2008) suggested teachers who believe in strategy diversification and emphasize the importance of reading inspired confidence and competence in their students.

Measuring beliefs about teaching approaches and practices. Diverse assessments abound that measure beliefs about teaching practice and how teachers approach instruction. Understanding the theoretical or value-laden influences on pedagogy is important, as these types of beliefs may influence the use of specific instructional strategies thought to accelerate student learning. Some measures assess teaching practice using a domain-general focus such as evaluation of overall pedagogical knowledge (Voss, Kunter, & Baumert, 2011), or assess beliefs related to specific theoretical approaches to instruction including constructivism (Lenski, Wham, & Griffey, 1998; Plourde & Alawiye, 2003; Woolley, Benjamin, & Woolley, 2004) or inquiry (Bhattacharyya, Volk, & Lumpe, 2009; Marshall, Horton, Igo, & Switzer, 2009), although many measures focus on the evaluation of specific practices or preferred methods hypothesized to assist certain student populations (see Table 7.4).

One intriguing approach to measure teachers' beliefs concerning instructional strategies is the teacher belief Q-sort (TBQ; Rimm-Kaufman, Storm, Sawyer, Pianta, & LaParo, 2006), which was developed specifically as an alternative to potentially biased observation and the typical self-report approaches. The TBQ method requires participants to rank order priorities and beliefs about discipline practices, classroom practices, and beliefs about children. The rank order process, a forced choice method, mediates potential personal bias associated with Likert scales, because teachers do not have to indicate prevalence for demonstrating a particular strategy that may be influenced by a belief. Instead, the method creates a paradigm for evaluating relative preference for a particular teaching practice in comparison to another.

Voss et al. (2011) developed an instrument to assess general pedagogical/psychological knowledge (PPK). General knowledge, encompassing declarative and procedural knowledge, is purported to transcend knowledge of individual subjects (Shulman, 1987), and thus a measurement with validity evidence may be critical to inform overall teacher pedagogy. Confirmatory factor analysis using German teacher candidates indicated that PPK was a distinct construct measuring correlated factor sub-dimensions, which included knowledge of classroom management, knowledge of teaching methods, knowledge of classroom assessment, and knowledge of students' heterogeneity. Although traditional psychometric procedures were used to evaluate the utility of the instrument, this measure is particularly innovative as beliefs concerning classroom management were assessed using interpretation of video-based vignettes, hence employing a methodology less suspect to the bias of exclusive self-report measures.

Measuring beliefs about students. A paucity of measures (seven) provides reliable evidence to assess teachers' beliefs about students (Table 7.5). The most prevalent method of gauging teachers' beliefs about students are questionnaires, such as the Personal and Professional Beliefs About Diversity Scale (Pohan & Aguilar, 1994; used by Dedeoglu & Lamme, 2011), which measured beliefs about diversity in a personal sense and within a professional context, or the Teachers' Beliefs and Attitudes Toward Planning for Mainstreamed Students (TBAP; modified for preservice

Table 7.4 Representative Sample of Teaching and Practice Measures

Constructs Measured	Name/Type of Measure	Empirical Examples	Psychometric Evidence	Potential Usage/ Comments
Use of strategies designed to promote critical thinking	Critical Thinking Belief Appraisal – Questionnaire	(Torff & Warburton, 2005)	Content review, internal consistency, factor analysis	Illuminated the use of critical thinking strategies as a conduit to effective instruction.
Developmentally appropriate practices by early childhood teachers	Teacher Beliefs Scale (TBS)– Questionnaire	(Charlesworth et al., 1993)	Factor analysis, observation data	Identified what beliefs are associated with using developmentally appropriate teaching practices.
Constructivist and traditional approaches to teaching and learning	Teacher Beliefs Survey (TBS) – Questionnaire	(Woolley, Benjamin, & Woolley, 2004)	Teacher interviews for construct identification, factor analysis, internal consistency	Revealed that the factors of Traditional Management, Traditional Teaching, and Constructivist Teaching can be identified by teacher beliefs.
Metacognition and heuristics	Videotaping and interviews; metacognitive model analysis	(Depaepe, De Corte, & Verschaffel, 2010)	Inter-rater reliability, member checking, content analysis	Qualitatively compared teachers in two sixth-grade classrooms to determine what beliefs influence the use of metacognitive and heuristics related to word problem solving.
Inquiry instruction in science	Untitled questionnaire	(Marshall, Horton, Igo, & Switzer, 2009)	Factor analysis, internal consistency	Determined that grade level taught, content area taught, level of support received, and self-efficacy for teaching inquiry were related to the frequency of inquiry instruction.
Social and emotional learning	SEL Beliefs scale – Questionnaire	(Brackett, Reyes, Rivers, Elbertson, & Salovey, 2012)	Content review, factor analysis, convergent evidence	Measured the teaching of social and emotional principles in the classroom, partitioned into scales of comfort, commitment, and culture.
Grading	Survey of Assessment Beliefs (SAB) – Questionnaire	(Bonner & Chen, 2009)	Vignette content analysis, factor analysis, internal consistency	Confirmed a “success bias” that may influence objective grading practices.
The nature and purpose of assessment	Chinese-Teacher Conceptions of Assessment inventory- Questionnaire	(Brown, Hui, Yu, & Kennedy, 2011)	Factor analysis	Multi-nationally identified that beliefs in improvement, accountability, and irrelevance are related to assessment practices.

Table 7.5 Representative Sample of Student Measures

Constructs Measured	Name/Type of Measure	Empirical Examples	Psychometric Evidence	Potential Usage/Comments
Adult students with learning disabilities	Unnamed Likert scale – Questionnaire	(Murray, Wren, & Keys, 2008)	Content review, exploratory factor analysis	Examined differences in attitudes toward adult students with learning disabilities based on demographics and contextual factors.
Children's difficulties in learning	Revised version of Teacher Attribution Scale – Vignettes	(Brady & Woolfson, 2008)	Content review, internal consistency	Concluded that teachers' attributions about students' difficulties in learning affect student learning outcomes.
Multiculturalism and egalitarianism in the classroom	Teacher Cultural Beliefs Scale (TCBS) – Questionnaire	(Hachfeld, et al., 2011)	Content review, confirmatory factor analysis	Assessed teacher beliefs about cultural diversity and proved the two constructs as distinct.
Social characteristics	Vignettes; Revised Cheek & Buss Shyness Scale (RCBS) – Questionnaire	(Coplan, Hughes, Bosacki, & Rose-Krasnor, 2011)	Factor analysis	Found a correlation among teachers' beliefs toward social characteristics (i.e., shyness, exuberance) and student learning outcomes.

teachers, P-TBAP), which assessed beliefs, skills, and intended practices concerning students with mental retardation (Cameron & Cook, 2007).

Alternatively, mixed methods such as vignettes and questionnaires were employed by Brady and Woolfson (2008) and Coplan et al. (2011) to measure beliefs and responses to students' learning difficulties and social behavior, respectively, and Ripski, LoCasale-Crouch, and Decker (2011) used questionnaires in addition to in-class observation. In their study of teachers' beliefs about social characteristics, Coplan and colleagues (2011) adapted a more comprehensive approach and presented inservice elementary teachers with vignettes, or hypothetical scenarios, of children displaying exuberant, typical, and shy behaviors to determine their beliefs and strategies in relation to teachers' own degrees of shyness. Responses were categorized into five strategy categories (e.g., high-powered response, indirect strategies). Additionally, teachers rated levels of student academic abilities, intelligence, and

possible negative consequences from their behaviors on a scale to determine if teachers' beliefs about strategies and teacher shyness and child gender moderated strategy choice. The approach was deemed a valid measure of how teachers' own characteristics mediated their beliefs and hypothetical responses toward students' social and classroom behavior.

Synopsis of Belief Measures

Tables 7.1–7.5 reveal a compilation of belief constructs and measures empirically substantiated with strong evidence of validity and as noted supportive of guiding classroom teaching and learning. However, the measurement of teachers' beliefs is dominated by self-report questionnaires, which are frequently subject to response bias, or the inability of practitioners to accurately report or describe their own beliefs (Kagan, 1992; Rimm-Kaufman et al., 2006). Researchers should cautiously interpret evidence from self-report measures, and avoid making inferences to divergent populations that differ from the validity evidence described in a particular study. Using multiple measures (either self-report or through the adaptation of the novel approaches described) should enhance the ability of researchers to make plausible, valid, and reliable inferences from observed data. However, despite the strength of many instruments to accurately assess which constructs influence teacher practice, interpretative issues concerning belief data abound.

ACCURATE INTERPRETATION OF BELIEF DATA

Belief measures are designed to provide a means for researchers and practitioners to interpret the underlying psychological constructs and conceptual representations that guide teacher decision making and instructional practices. Considering the largely implicit nature of beliefs (Fives & Buehl, 2012), evaluation of belief data can be precarious and should be approached with interpretative caution recognizing errors of both measurement and analysis. Measurement concerns are those related to fundamental design and psychometric considerations such as reliability and validity concerns, while analysis concerns are based upon how the data is interpreted and applied.

Measurement Concerns

First, consideration should be given to the degree of domain specificity assessed and measured by an instrument or evaluative process. Domain specific measures are those that refer to the extent of individual emphasis on a particular construct or subset of beliefs, such as effective strategies for teaching math content (Rethlefsen & Park, 2011), while domain general measures tend to assess global beliefs or describe general views of educational practice and philosophy (Sinatra & Kardash, 2004). Teachers hold general beliefs about education, but also distinct representations about certain subjects or pedagogical practice. Most measures have a polarized design focus taking either a domain specific or domain general approach.

For example, Van Driel, Bulte, and Verloop (2007) investigated subject-matter beliefs in chemistry combined with overall beliefs about curriculum, revealing

distant factorial structures for each belief type. Similarly, Chou and Kwan (2012) concluded that Korean preservice math teachers can hold both objective and non-constructivist views toward mathematics teaching in combination with disparate beliefs concerning constructivism and how general knowledge is developed. Although the distinction between domain general and domain specificity is broadly contested based on a myriad of interrelationships among constructs (Buehl, Alexander, & Murphy, 2002; Pajares, 1992), to mitigate the issue of domain specificity researchers and practitioners should be keenly aware of the constructs measured by a particular instrument or method and the type and source of data upon which validity evidence is based prior to assessing intervention suitability.

Second, design intentionality can also influence the situational applicability of a belief measure. Attention should be given to understanding what standards, models, settings, samples, and purposes were considered when psychometrically evaluating the instrument or measurement tool. In other words, an instrument deemed effective in one teaching or learning context may not be suitable for another, therefore limiting the external validity of the inferences from the instrument. Sometimes referred to as “localization,” the process of validation and subsequent usage of a measure can be determined through a variety of methods (see Schraw & Olafson, Chapter 6, this volume). Frequently, a measure is normed for a particular population or usage and practitioners should avoid the pitfall of “vulnerability of generalization” (Shadish, Cook, & Campbell, 2002, p. 22), whereby a measure is arbitrarily administered to an intuitively similar population. One particularly relevant example is the use of a teachers' beliefs instrument to determine hiring or performance assessment models. Metzger and Wu (2008) used meta-analytic techniques to measure the affective beliefs, values, and attitudes of preservice teachers using the Teacher Perceiver Interview (TPI) to determine the relationship between results and the ability to predict teacher quality. Minimal predictive validity evidence (.28) was found between obtained scores and overall teaching effectiveness. The authors specifically cautioned, the “TPI does not claim to measure effective teaching but instead identify teacher candidates who communicate the same professional values and dispositions as the ‘best’ teachers” (p. 924). Studies of this nature confirm the potential hazards associated with using teachers' beliefs instruments for any other purpose than intended.

Third, issues may also arise from lack of consideration of the malleable nature of beliefs, combined with the temporality of measurement and changes over time. Researchers suggest that the stability of teachers' beliefs operates along a continuum (Fives & Buehl, 2012) with some beliefs subject to rapid evolution and transition (e.g., teaching strategies, see Muis, 2007) while others, such as views about teaching knowledge and personal epistemology, may be deemed relatively stable (Buehl & Fives, 2009). Many empirical studies seek to assess the degree of belief change associated with an intervention, determine what factors are related to belief change, or see if and how teachers' beliefs evolve over a semester or academic year. These research paradigms would suggest that diverse interpretations concerning the nature of beliefs would be a function of both the timing and frequency of measurement.

To address the malleable nature of beliefs and better understand belief trajectory, we advocate longitudinal designs using qualitative or multivariate repeated measures

techniques. Longitudinal designs are those that collect data at two or more different times from the same individuals or entities and avoid the consequences of mono-measurement bias, excluding premature or unwarranted causal conclusions based upon singular data points. Additionally, longitudinal designs may allow researchers to assess belief change without direct intervention. For example, Fletcher and Luft (2011) investigated preservice teachers' beliefs about teaching and learning science using an interpretative qualitative design and concluded that early field experiences strongly influenced eventual teaching practices. Repeated observation provided the ability to reliably assess long-term change in beliefs and practice, which might not have been feasible through appended observations.

Fourth, levels of measurement can also lead to differential conclusions. Level means creating an understanding as to the nested influence of districts, schools, programs, classrooms, or individuals upon belief formation and change, combined with the contextual circumstances of measurement. Tatto and Coupland (2003) described the "closeness" of measurement outcomes, indicating that precision of belief measurement is a function of the relation of measurement to intervention. Closeness means measuring beliefs at the individual or classroom level since most interventions designed to influence beliefs are localized. Conversely, an intervention designed to modify beliefs at the school level (e.g., the influence of district-wide common-core standards) would require a much more sensitive and robust measure to reliably assess causal relations with individual beliefs. Contingent upon sample size, multi-level analysis should be considered whenever possible to account for the multiplicative and nested effects of various hierarchical influences.

Interpretative Concerns

Historically, a large plurality of measures involve self-reports (Moyer-Packenham et al., 2008), which typically ask respondents to articulate the degree or potency of beliefs, the frequency of certain behaviors manifested by beliefs, or the alleged prevalence of traits or characteristics using a five-point or greater Likert scale. The majority of studies using self-report employ only a single belief measure (Tatto & Coupland, 2003), which adversely affects reliability and exacerbates the limitations of self-reported data.

Self-report is notorious for generating erroneous reporting by respondents (Kagan, 1990; Kane, Sandretto, & Heath, 2002; Speer, 2005). The automatic and implicit nature of many entrenched beliefs may result in conscious fabrications (Feldon, 2007), promulgate mischievous respondents, and contribute to deliberate response bias (Hyman & Sierra, 2011). Many individuals feel obligated to present favorable self-images to researchers resulting in response inaccuracies based on the contrived perceptions of social desirability (Johnson & Fendrich, 2002). Reporting and interpretative errors are so pervasive that in a study investigating how experts' self-reported beliefs related to problem solving, Feldon (2010) lamented "participants' self-explanations are largely inaccurate" (p. 395). The paradigm becomes increasingly egregious as many teachers believe that certain epistemological and pedagogical beliefs are socially desirable, such as employing constructive teaching strategies, and may exhibit a proclivity to erroneously report actual teaching practices (Gill & Hoffman, 2009; Judson, 2006).

Additionally, teachers tend to inaccurately calibrate their own beliefs (Maggioni & Parkinson, 2008; Muis, 2007), miscalculating the depth of their knowledge and exemplifying myopic perspectives. Sometimes described as *myside* bias (Stanovich, 2009), this type of partiality occurs when evidence is used to make moral and affectively grounded decisions, many of which are influenced by belief structures. Teachers focused deeply on individualistic perspectives tend to believe their perceptions of a situation are more closely aligned with reality than those of an independent observer (Stanovich, 2009). Thus, interpretation of belief measures should account for the filtered perceptions of teachers. Myside bias is particularly problematic when interpreting qualitative measures of teachers' beliefs such as observations of instructional practice. Interpretative concerns may be mitigated by employing controls such as inter-rater reliability and the usage of precise observation protocols with behavioral exemplars.

Finally, interpretative concerns should be guided by a nuanced understanding of the cultural exclusivity of belief measures. Most measures have been developed based upon the philosophy and belief orientations of Western cultures and teaching practices found in North American classrooms (Choi & Kwon, 2012). For example, many researchers have concluded significant variability of epistemology beliefs across diverse cultures (Bernardo, 2008; Chan & Elliot, 2002) with Western beliefs more deeply individualistic, while Asian cultures align with more collectivist beliefs about the nature of knowledge (Youn, 2000). Measures deemed relevant and valid in Western cultures may lack psychometric and conceptual integrity when used with disparate populations. We advocate cautious data interpretation of localized measures and more research in this area to precisely determine the regional applicability of belief measures.

RECOMMENDATIONS FOR PRACTITIONERS AND FUTURE RESEARCH

In light of these findings we advance several recommendations concerning the measurement of teachers' beliefs. First, in order to enhance reliability of measurement and overcome the liabilities of self-report, variable types of measurements should be considered. Methods described such as card sorting (Rimm-Kaufman et al., 2006), illustrative mental mapping (Love & Kruger, 2005), and naturalistic observation of teacher discourse (Gill & Hoffman, 2009) are just a few methodologies that provide evidence of validity concerning how teachers' beliefs influence practice. The utilization of dual measurements, which assesses cognitive processes concurrent with behavioral observations, provide the advantage of convergent validity evidence and the potential for more accurate measurement of implicit beliefs.

Second, longitudinal studies that examine the developmental trajectories of beliefs are highly recommended during the design phase. Multiple observations alleviate the situational influence of snapshot measurements, while potentially diffusing the immediate influence of researcher expectations on quasi-experimental outcomes. Continuous measurement progression allows for observation of behavioral manifestations over time, avoiding the pitfall of content and curricular bias, and provides evaluation opportunities using time series and repeated measure designs, which rule out many threats to validity (Shadish et al., 2002).

Third, we strongly endorse investigation of measures that assess the emerging importance of technology beliefs of teachers (see Ertmer, Ottenbreit-Leftwich, & Tondeur, Chapter 23, this volume). For example, despite the enormous popularity of tablet and iPad technology, a February 2013 PsychInfo search using the terms “teacher beliefs” and “iPad” returned two results, and similar searches using “teacher beliefs” and “tablets” returned one peer-reviewed article, while “mobile technology” returned 17 results dominated by small-sample case studies with limited generalizability. The lack of studies that provide evidence of validity is likely a function of the transitory nature of technologies used by educators, in conjunction with the prolonged publication cycle found in educational research, which may not keep pace with emergent technologies. Regrettably, conceptions of technology beliefs may strongly influence pedagogy (Ertmer et al., Chapter 23, this volume; Judson, 2006) and should be a priority for researchers.

Fourth, our review revealed the scarcity of research showing direct causal relations between teachers’ beliefs and student learning outcomes. We strongly advocate designs that include dependent variables that measure student performance, such as achievement test scores, measures of engaged behavior, and learner feedback. Assuming adequate sample size, designs should include multi-level modeling to control for the relative influence of school and teacher variables, in order to assess the true score effect of belief influences.

Finally, our review of the literature revealed the conspicuous absence of empirical research concerning beliefs about the nature of educational reform, teacher evaluation, and educator/administrator tenure perceptions. Considering the strong reform emphasis currently proliferating teacher education programs (Good, Wiley, & Sabers, 2010), and as the preeminent goal of belief research is to enhance teacher performance and student learning outcomes, it seems shocking that assessments of these aforementioned belief structures remain so elusive.

Going forward we advocate that researchers and practitioners carefully evaluate which measures provide valid evidence affirming the instrumental role of teachers’ beliefs on practice. This review revealed a paucity of empirical evidence substantiating that individual beliefs are instrumental in promoting exceptional student achievement. Although we speculate that belief conceptions are related to variation in student learning outcomes, we should advance knowledge beyond conventional wisdom and wishful thinking to empirically validate how teachers’ beliefs influence cognitions, behaviors, and emotions in the classroom.

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8

QUALITATIVE APPROACHES TO STUDYING TEACHERS' BELIEFS

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Responding to the question “Why do qualitative research?” Corbin and Strauss (2008) wrote, “Qualitative research allows researchers to get at the inner experience of participants, to determine how meanings are formed through and in culture, and to discover rather than test variables” (p. 12). Qualitative research is perhaps ideally suited to the “messy” construct of teachers’ beliefs (Pajares, 1992), as the development of a complex, detailed understanding of teachers’ beliefs can be established by talking directly with teachers, going to their schools, and allowing them to tell their stories (Creswell, 2013).

Well-designed qualitative approaches have much to offer the growing field of the study of teachers’ beliefs. A deeper understanding about the ways in which teachers develop, change, and act upon their beliefs over time and in a variety of contexts requires the use of qualitative approaches in which researchers can attend fully to the lived experiences of teachers.

This chapter focuses on studies of teachers’ beliefs that utilized qualitative methodologies. Our chapter has four broad goals: (1) to identify the qualitative methodologies that are used to study teachers’ beliefs, (2) to describe how these methodologies have been used in the field, (3) to provide a methodological critique of qualitative studies of teachers’ beliefs, and (4) to identify a number of exemplary qualitative studies of teachers’ beliefs. In order to address these four goals, our chapter begins with a review of studies that utilized qualitative approaches for studying preservice and experienced teachers’ beliefs. This review describes studies as categorized into various methodological approaches. Next, we provide a summary of general trends across methodologies. The final sections of the chapter include a methodological critique and conclusion.

DESCRIPTION OF SEARCH AND REVIEWING PROCESS

Fives and Buehl's (2012) process for reviewing published literature was used as a guide to conduct our own expansive and thorough review of literature. Although we were mainly interested in databases such as Academic Search Premier, ERIC, PsychArticles, and PsychINFO, we did not want to limit our search to only these databases and risk missing a qualitative article on teachers' beliefs found in a different database. We searched a variety of databases using the search terms "teacher*, belief*, and qualitative*" along with the following search criteria: limited to peer-reviewed articles from scholarly publications, and limited to articles written in English. We did not review several book-length accounts of teachers' beliefs that have been recently published, such as Simon Phipps's (2010) case study on the development of beliefs and practices in teaching grammar. Nor did we review the hundreds of dissertations focusing on teacher beliefs and practices, such as *Beliefs and Instructional Practices of Culturally Relevant Educators: A Qualitative Case Study* (Varian, 2008). Our focus on empirical studies also led to the exclusion of handbooks (i.e., *Handbook of Interview Research*), books (i.e., *Case Study Research*), and book chapters emphasizing methods for conducting qualitative research; however, we include a number of these methodological references in the discussion of reviewed articles. Our narrowed focus on selecting peer-reviewed journal articles is one limitation of our review.

The search described above yielded a total of 568 articles. We then eliminated articles that did not have a focus on teachers' beliefs (i.e., parents' beliefs), were not empirical, and those that utilized a mixed methods design. We also eliminated studies that employed emerging and innovative qualitative methodologies as these are addressed elsewhere in this volume (Bullough, Chapter 9, this volume). After this process was complete we were left with 112 relevant articles.

In order to systematically review the articles, we created a spreadsheet in which each article was summarized by methodological characteristics such as participants, content area and context, the nature of beliefs being studied, methodology, data sources and analysis, use of methodological references, findings, and discussion of trustworthiness. The articles were then divided into three equal groups, and each author received one group of articles to summarize. After we each analyzed three articles we met as a group to discuss and standardize the process. Summarizing all articles on the spreadsheet yielded a 29 page document that was uploaded into ATLAS.ti, a software program for qualitative analysis. ATLAS.ti facilitates many of the activities involved in data analysis and interpretation, but does not automate these processes (Muhr, 2004).

Because we were interested in trends that could be evidenced by frequency, we engaged in a modified form of content analysis (Berg, 2007). As noted by Berg, "counts" of textual elements can provide a way to identify and organize qualitative data (p. 269). The analytic activities involved in a content analysis include developing codes, applying the codes to the data, and identifying patterns and relationships. An initial list of codes was developed deductively. In this approach, researchers use a categorical scheme suggested by a particular theoretical perspective (Berg, 2007). In our case, we began by using Creswell's (2013) identification of five approaches to qualitative inquiry that have stood the test of time: case study, phenomenology,

grounded theory, narrative research, and ethnography. In agreeing with Creswell's rationale for these five approaches as standing the test of time, we also recognize that other methodological scholars have different approaches for identifying qualitative genres (Marshall & Rossman, 2011), traditions (Atkinson, Delamont, & Hammerley, 1988), or paradigms (Guba & Lincoln, 2005). Using Creswell's approach as a framework is an additional limitation to our work.

IDENTIFICATION OF METHODOLOGIES

In order to identify methodological trends, we began by categorizing each article by its qualitative approach. We use the term *methodology* as a more generic term referring to the general logic and overall approach for a research project, and the term *methods* to refer to specific techniques used to collect data (Bogdan & Biklen, 2007).

As noted above, we started with Creswell's five approaches to qualitative inquiry: case study, phenomenology, grounded theory, narrative research, and ethnography. Action research and self-study were subsequently added as categories as there were a number of articles that explicitly indicated the use of these methodologies. We also included an additional category for studies that indicated a more general approach to qualitative inquiry. The *General* category was applied to studies that declared qualitative methodology without indicating a specific approach and to studies that described qualitative data collection strategies and analysis without noting a specific qualitative methodology. In the next section of the chapter we provide a summary of these methodological categories and the ways in which they were utilized.

Case Study

Case study research is a qualitative approach in which the investigator explores a real-life, contemporary bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information (e.g., observations, interviews, audiovisual material, and documents and reports), and reports a case description and case themes.

(Creswell, 2013, p. 97)

Twenty-nine studies were categorized as case studies. In order to be categorized as *case study*, authors needed to explicitly note the use of case study methodology. For example, although Delgado's (2008) study of one teacher's beliefs about English language learners may have been an example of a singular case study, she indicated that her research design was a naturalistic inquiry, undertaken to identify the teacher's beliefs as reflected in her practices. Delgado's study was therefore categorized as *general*. Slightly more than half of the case studies described methodology in a very general manner, without providing a description of the case study's design. For example, DeCoito, (2006, p. 342) noted that "a qualitative case study approach was used," and Chai (2010) stated that a qualitative case study approach was adopted.

Identifying the cases. Once the researcher has decided that a case study design is appropriate, the next step is to identify the case(s) (Creswell, 2013). The object of study in a case study is a specific, unique, bounded system such as a child, a

classroom, or an event (Stake, 2005). However, case studies vary with respect to the number of cases involved (Creswell, 2013). In a singular case study, for example, only one case is selected. Three of the studies were singular cases of individual teachers.

Stake (2005) used the terms *collective* and *multi* interchangeably to describe studies in which a number of cases are studied jointly. Although 25 of the studies in our sample consisted of multiple cases, only five studies described a collective or multi-case study design. Theriot and Tice (2009), for example, developed case studies of six practicing middle school teachers in their collective case study of teachers' beliefs and practices related to literacy development. Hoffman (2003) described an approach that she identified as a modified multi-case study: "Case studies were constructed of four elementary multiage teachers by examining each teacher and classroom carefully, comparing each, and providing examples of beliefs and practices in these multiage classrooms" (p. 6).

Three studies explicitly noted the use of a longitudinal approach to case study. Achinstein and Ogawa (2011) conducted a four year qualitative case study, noting that "The case study approach offers an opportunity to describe teachers' conceptions and the nature of classroom practice over time" (p. 2510). Deal and White (2006) also stated that the longitudinal nature of their case study of literacy beliefs and practices of two novice elementary teachers was well-suited to studying evolving beliefs over the three years of their study. Wyatt's (2010) study of a high school English teacher was also conducted over a period of three years, allowing him to fully explore reported beliefs with observed behaviors.

Participants. More than three-quarters of the case studies involved practicing teachers, with a majority of participants having more than two years of experience teaching at the secondary level (e.g., grades 6 through 12). One study (Fletcher & Luft, 2011) followed five preservice teachers as they became early career secondary science teachers. Approximately 80% of the studies had between 2 and 10 participants. The five studies that included more than 10 participants ranged from 19 participants up to 50 (Kesici, 2008).

The studies that included multiple cases were bounded by the use of preexisting groups. For example, the majority of studies involving preservice teachers occurred within the context of a particular undergraduate course, such as science methods (Hancock & Gallard, 2004; Osisioma & Moscovici, 2008), social studies methods (Doppen, 2007), or a multicultural course (Huerta & Flemmer, 2005).

Focus of inquiry. We grouped the studies on practicing teachers' beliefs into three main categories: content area, pedagogy, and learner characteristics. The majority of these case studies focused on teachers' beliefs in specific content areas such as technology (e.g., Bain & McNaught, 2006; Chai, 2010), math (e.g., Raymond, 1977), science (e.g., DeCoito, 2006; Johnson, 2006), or literacy (e.g., Deal & White, 2006; Theriot & Tice, 2008).

Teachers' beliefs about instructional strategies and pedagogical issues was the second largest group of studies. Topics of study included beliefs about group work, multi-aging, assessment, and culturally responsive teaching. The third category, with the fewest number of studies, focused on beliefs about specific characteristics of students, such as students who were deaf and hard of hearing, or those considered at-risk.

Applying the same categories to the five papers that studied preservice teachers resulted in three content areas: social studies (Doppen, 2007), science (Hancock & Gallard, 2004; Osisioma & Moscovici, 2008), and literacy (Scharlach, 2008). One study was related to pedagogical issues (i.e., Huerta and Flemmer's study on beliefs about diversity), and there were no studies in the preservice case study group that focused on learner characteristics.

Data collection. According to Creswell (2013), providing an in-depth picture of the case requires gathering extensive material from multiple sources. Many types of data collection methods are typically conducted for case studies including observations, interviews, and collecting documents and artifacts such as lesson plans (e.g., Fletcher & Luft, 2011), participants' written reflections and assignments (e.g., Osisioma & Moscovici, 2008), and drawings representing beliefs (Hancock & Gallard, 2004). Several studies in our sample combined interviews and observations in order to examine the relationship between beliefs and practices. Interviews were conducted to elicit teachers' expressed beliefs, and then classroom observations were conducted to determine if teachers' beliefs were related to classroom practices. For example, Hoffman (2003) studied four multiage teachers in intermediate elementary grades in order to determine how beliefs guided their practices. Each teacher observation consisted of an entire school day and an observation guide was used to record the data. Additionally, classroom interactions were videotaped. The videotape was utilized in the post-observation interviews, in which participants interpreted their classroom practices. As described by Hoffman (2003) "The interviews provided data about teachers' beliefs, and the observations provided data about their organizational and instructional practices" (p. 15).

Analysis. The case studies varied considerably with respect to methods used for analyzing data and the amount of information provided to describe analytic procedures. One study (DeCoito, 2006) did not provide any information about the ways in which data were analyzed. Although DeCoito (2006) spent four months in a school, conducting classroom observations and interviews with each participant, analysis of these data was not addressed.

In a few studies, analysis of data was described in a general manner, offering limited details about analytic procedures. For example, Osisioma and Moscovici (2008) stated that they "utilized interpretative methods to analyze data" (p. 292), and Reed (2003) indicated that data "were analyzed for similar phrases, patterns, ideas, and themes concerning beliefs and practices" (p. 335).

Seven studies utilized the constant comparative method for data analysis (Alviar-Martin, 2010; Chai, 2010; Deal & White, 2006; Doppen, 2007; Garrahy, 2001; Leonard, Napp, & Adeleke, 2009; Sahin, 2010). Glaser and Strauss (1967) are credited with introducing the constant comparative method, which they described as consisting of four stages: coding, integrating categories, delimiting the theory, and writing the theory. Basically, the constant comparative method is an analytic process of comparing different pieces of data for similarities and differences (Corbin & Strauss, 2008). As noted by Merriam (1998), the constant comparative method has been adopted by many qualitative researchers who are not seeking to build theory. However, the case studies reviewed did not describe how the constant comparative method was used.

Several studies indicated the use of cross-case analysis. In studies involving a number of cases, a typical format for analysis includes two forms of analysis. First,

a detailed description of each case and themes within the case are provided, followed by a thematic analysis across the cases, called a cross-case analysis (Creswell, 2013). Achinstein and Ogawa (2011), Casebolt and Hodge (2010), Fletcher and Luft (2011), Hoffman (2003), Scharlach (2008), Song and Looi (2012), and Theriot and Tice (2009) all utilized a cross-case analysis in order to search for patterns across cases. Theriot and Tice (2009) described their cross-case analysis of data from six middle school teachers' beliefs and teaching practices in literacy: "In looking across cases we looked for themes and patterns that emerged from the data" (p. 67).

The use of coding was indicated in six studies (Bain & McNaught, 2006; Huerta & Flemmer, 2005; Kelly-Jackson & Jackson, 2011; Johnson, 2006; Lee, 2010; and Wyatt, 2010). Descriptions of coding procedures ranged from minimal, such as "Data was analyzed by selective coding and sorted into themes and categories" (Lee, 2010, p. 26), to more extensive descriptions. Bain and McNaught (2006) thoroughly described how interview transcripts and documentary material obtained from Australian academics were first coded on belief and practice dimensions, and were further analyzed to create five belief/practice categories. One belief/practice pattern was described as "learning facilitator" which consisted of a belief dimension that included a strong disciplinary focus and constructivist orientation and a practice dimensions that included an open task structure with low interactivity.

Case studies with a quantitative component. In addition, we identified five case studies that incorporated a quantitative component. Three of these studies (Aulls & Ibrahim, 2012; Hersman & Hodge, 2010; Savasci & Berlin, 2012) cited Yin, a methodologist whom Creswell (2013) relied upon when describing distinctive features of case study. Yin (2009) noted that using quantitative data in a case study can yield appreciable benefits when the quantitative data is relevant to the behavior or events that are being studied. Typically, the studies in our sample included the use of a survey instrument or involved the quantification of qualitative data. Survey instruments utilized were developed by the investigator (Bateman, 2008), or were preexisting, such as Hersman and Hodge's use of the Physical Educators' Judgments About Inclusion survey, and the Classroom Learning Environment Survey that was utilized by Savasci and Berlin.

Aulls and Ibrahim (2012) quantified their qualitative data. They analyzed 21 essays written by preservice teachers about the perceptions of effective post-secondary instruction. They categorized teacher roles and student roles in effective inquiry and then calculated the frequency of each category and their effect sizes; as they described, however, "It is important to note that this study is 'purely' qualitative in nature, even with the reporting of frequencies of effect sizes" (p. 124).

The data collection for the case studies that included quantitative analyses was extensive. For instance, Bruce and Ross (2008) studied 12 practicing teachers (grades three and six) who were involved in a six-month professional development program focused on teaching strategies in math. Over the course of the program the researchers observed two math lessons, teachers completed an on-line, self-assessment at the beginning and end of the program, and each teacher was observed by a peer on three occasions. At the conclusion of the study, teachers were interviewed. The researchers calculated means and standard deviations for dimensions of effective teaching when teachers completed the self-assessment. Bruce and Ross argued that including quantitative summaries contributed to the credibility of their cross-case claims.

Contributions of case studies. Case study methodology is well-suited to the study of teachers' beliefs and practices as they occur in the natural setting of the classroom. The majority of the studies reviewed occurred in the real-life context of the classroom, and this allowed an investigation of the complex relationships between beliefs, practices, and contexts. As Yin (2009) noted, "The case study will typically be about complex events and behaviors, occurring within a possibly more complex, real-life context" (p. 129). The use of multiple methods allows researchers to gather a variety of data points at different points in time, which is beneficial when looking at complex phenomenon. As Garrahy (2001) described, the use of multiple methods was critical to her understanding of possible sources of gender differences in classrooms, because "A teacher's gender beliefs are most often inferred and difficult to capture with one instrument or means of data collection" (p. 84). In the case studies reviewed, data collected while observing teachers in their classrooms was often used to corroborate teachers' espoused beliefs. Case study methodology, and cross-case analysis in particular, allows researchers to discover patterns across cases (e.g., Fletcher & Luft, 2011; Scharlach, 2008) and to compare the consistency of a phenomenon within and between cases (Aulls & Ibrahim, 2012).

Phenomenology

The main objective of phenomenological research is to understand the essence of a single phenomenon. The exploration of the phenomenon occurs by studying a group of people who have all experience the phenomenon (Creswell, 2013).

There were a total of seven studies that utilized phenomenological, or phenomenographic, methodology as the research design. Haser and Star (2009) noted that phenomenology was the best fit for their study because this work "attempted to describe mathematics related beliefs, a worldview, of beginning teachers as they were impacted by the first-year teaching in a national curriculum context, a phenomenon experienced by the participants" (p. 296). Paakkari, Tynjala, and Kannas (2011) described their study of preservice teachers' conceptions of learning as a phenomenographic design in which the goal was to reach a collective understanding of the target phenomenon.

Participants. Two of the studies were conducted in the United States (Flowerday & Schraw, 2000; Rushton, Lotter, & Singer, 2011). The remaining studies were conducted in Turkey (Haser & Star, 2009), Australia (Owen, 2009), Finland (Paakkari et al., 2011), Chile (Labrana, 2007), and China (Zhao et al., 2009). Six of the seven phenomenological studies involved practicing teachers. The only study conducted with preservice teachers was Paakkari et al.'s (2011) study of 20 Finnish university students who were studying physical education and specializing in health education.

Data collection and analysis. The primary data source for all seven studies was interviews, as is typical in phenomenological studies (Creswell, 2013). The majority of the studies in our sample described multiple interviews. Flowerday and Schraw (2000), for example, conducted a series of in-depth interviews with their participants as they examined teachers' beliefs about instructional choice. Labrana (2007) followed the three-interview format described by Seidman (1991) to conduct interviews with his 27 participants.

Thorough descriptions of analytic procedures were provided in most of the phenomenological articles. Phenomenological analyses typically include several levels of analysis, including analyzing data for significant statements or meaning units in order to construct textual and structural descriptions (Creswell, 2013). Consistent with phenomenological analyses, in her first phase of analysis Owen (2009) highlighted meaningful units from her interview transcripts of air traffic control instructors. These were reassembled into categories or themes, showing that collectively held beliefs and values impacted instructional strategies used in on the job training.

Contributions of phenomenology. In a phenomenological study, personal narratives are used to describe a person's lived experience with a particular phenomenon (Bernard & Ryan, 2010). Therefore, phenomenology is an appropriate methodology when "one's goal is to explore a phenomenon about which little has been written" (Flowerday & Schraw, 2000, p. 635). In phenomenological reports, including a structural description provides a descriptive account of the phenomenon. In Flowerday and Schraw's article, the structural description vividly described teachers' beliefs in their own words, and showed how teachers' experienced the phenomenon of providing choice in their classrooms. Additionally, their findings about instructional choice, based on the classroom practice of 36 teachers, allowed Flowerday and Schraw to develop guidelines for classroom practice related to when and how to use choice.

Grounded Theory

Grounded theory is a qualitative research design in which the researcher generates a general explanation (a theory) that is "grounded" in data from the participants (Corbin & Strauss, 2008). Participants in a grounded theory study have experienced the process or phenomena being studied, and the development of a theory is used to explain the phenomenon or provide a framework for further research (Creswell, 2013). There were six studies in our sample that utilized grounded theory.

Participants. The grounded theory studies involved both preservice and practicing teachers. Roehrig, Turner, Grove, Schneider, and Lui (2009) and Sainz, Palmen, and Garcia-Cuesta (2012) conducted grounded theory studies of practicing teachers. For example, Roehrig et al. explored the alignment of beliefs and practices of six beginning teachers and one experienced teacher who had been teaching for thirteen years. Three of the grounded theory studies focused on preservice teachers: Brownlee and Carrington (2000) conducted in-depth interviews with eight preservice teachers about their attitudes toward disability; Lin, Gorrell, and Silvern (2001) studied 298 Taiwanese early childhood preservice teachers' professional beliefs about teaching and learning; and Leatham (2007) conducted a study about the nature of technology in the classroom with four preservice secondary mathematics teachers. Buehl and Fives (2009) included both preservice and practicing teachers in their study on teaching knowledge. They analyzed data from open-ended responses of 53 preservice teachers and 57 practicing teachers, and uncovered a range of different beliefs about teaching knowledge.

Data collection and analysis. Grounded theory studies typically utilize interviews as the primary source of data, and this was the case for studies conducted

by Brownlee and Carrington (2000), Sainz et al. (2012), and Roehrig et al. (2009). Two of the grounded theory studies (Leatham, 2007; Lin, Gorrell, & Silvern, 2001) included additional data sources such as an open ended questionnaire, email correspondence, classroom observations, and participants' written assignments.

As described previously, Glaser and Strauss (1967) are credited with introducing the constant comparative method consisting of four stages: coding, integrating categories, delimiting the theory, and writing the theory. In a grounded theory, researchers engage in multiple levels of coding including open coding, axial coding, and selective coding (Creswell, 2013). Buehl and Fives (2009), for example, engaged in six stages of coding and categorization. In the final phase of a grounded theory study, a theory or model is typically generated and this is what distinguishes grounded theory from other qualitative approaches. Lin et al. (2001) created models of preservice teachers' beliefs about learning and teaching by first engaging in initial coding that produced a number of categories and themes. Next, they produced a diagram of relationships among the beliefs about teaching and learning. This allowed them to produce a visual display of their integrated conceptual framework that reflected the foundations and major concepts of teaching and learning in Taiwan (Lin et al., 2001). Roehrig et al. (2009) engaged in data driven open coding, and then conducted a cross-case analysis to identify key similarities and differences across teachers in order to develop "a testable model about potential mechanisms underlying the alignment of beginning teachers' practices and beliefs" (p. 167). Although Buehl and Fives (2009), Leatham (2007) and Sainz et al. (2012) described coding procedures consistent with grounded theory they did not provide theoretical models.

Contributions of grounded theory. The grounded theory design is especially important when a theory does not exist to explain a phenomenon (Creswell, 2013). The theory that is generated is "grounded" in the data from the research (Corbin & Strauss, 2008). As demonstrated by Lin et al. (2001), the development of an integrative conceptual model that provides explanatory power is a welcome addition to the field of teachers' beliefs. The observed patterns of preservice teachers could be applied to encourage examination of teacher preparation programs and to help teacher educators gain new perspectives related to preparing teachers for educating young children (Lin et al., 2001).

Narrative Research

The narrative method focuses on gathering the experiences as expressed in the lived or told stories of one or two individuals (Creswell, 2013). One study in our sample was characterized as narrative research. Del Rosario (2006) studied a high school English teacher's beliefs about teaching learning disabled students by conducting a series of individual interviews focusing on situations and events related to the participant's beliefs about learning disabled students. Del Rosario concluded that the narrative approach was a promising methodology as it allows teachers to reflect on the roots of their beliefs. We agree with Del Rosario that narrative account of practicing teachers could provide important insights about the development of their beliefs over time. See Bullough (Chapter 9, this volume) for additional commentary on the use of narrative method.

Ethnography

Ethnography is a qualitative design in which the researcher studies shared patterns of behavior, beliefs, and language of a cultural group (Creswell, 2013). None of the studies in our sample were categorized as ethnography. Given that the focus of an ethnographic study is to describe and interpret a culture-sharing group (Creswell, 2013) it is likely that researchers studying teachers' beliefs do not view ethnography as an appropriate methodology, as the focus of this body of research appears to be on individual teachers' beliefs, not on the beliefs of teachers as a cultural group.

Action Research

Action research is a systematic investigation that focuses on specific problems and local solutions (Stringer, 2007). It entails full collaboration between researcher and participants in deciding research questions and data collection with the purpose of engaging in sustained change (Marshall & Rossman, 2011). Three of the papers in our sample identified action research as the methodological approach used to study teachers' beliefs. According to Stringer, the methodology section of an action research report should include details about choice of participants, data gathering and analysis, and reporting processes. Leavy, McSorley, and Bote (2006) and Porto (2008) provided these details.

Leavy et al. (2006) saw their action research study as supporting reflective inquiry into their own instructional practices, with the overall goal of implementing a plan of action to improve the teacher education programs at two sites. Irish and American preservice teachers participated in metaphor construction activities and reflection activities which were used as data sources. Analysis of the metaphors constructed involved coding and categorizing for coherence to a particular pedagogical philosophy. Leavy et al. found that nearly half of the initial metaphorical representations of teaching were behaviorist in their orientation. Porto (2008) was also interested in modifying her instructional practices as a foreign language educator so that they aligned more closely with her beliefs about good pedagogy. To do so, she analyzed her teaching diaries, which were part of a broader action research study. As a result, Porto believed insights about her teaching were illuminated and led to becoming a better teacher educator.

In Liggett and Finley's (2009) study of 33 preservice teachers' attitudes towards discussing controversial diversity topics, the goal was to encourage critical consciousness which "could then lead to activism and change in schools" (p. 34). However, few details were provided about participants, and data gathering and analysis. Liggett and Finley used Blackboard discussions as their primary data source, and postings about participants' notions of diversity and teaching diverse populations were analyzed using a "grounded theory method of coding" (p. 35). They found that the likelihood of beginning teachers discussing controversial topics was dependent on whether or not they thought such discussions would jeopardize their teaching positions.

Contributions of action research. Action research is particularly suited to inquiry into professional programs. With respect to teacher preparation, the benefits of action research include enhancing the professional growth of educators, and improving the educational experiences of students (Stringer, 2007). All three studies

reviewed involved reflective inquiry into the teacher educators' own instruction with the explicit goals of professional growth and improving preservice teacher education. As demonstrated by Porto (2008), reflective inquiry into her own practice as a teacher educator shed light on issues faced by preservice and inservice teachers. Porto, for example, discovered inconsistencies between her own beliefs and practices. Like many of the studies with K-12 teachers, Porto found that accommodating the educational reality of the classroom in the framework of her beliefs about learner autonomy was difficult: what she said about learner choice and what happened in her classroom was inconsistent. Engaging in action research allowed her to uncover the discrepancy, reflect upon it, and led ultimately to professional growth.

Action research studies also provide important implications for teacher education. As noted by Leavy et al. (2006), their study showed the need to provide avenues for preservice teachers "to understand the values, attitudes, and beliefs that they bring to preservice education and then to plot and monitor their own professional growth" (p. 1230).

Self-Study

According to Samaras (2002), self-study is a legitimate form of research that leads to professional development through the critical examination of one's own teaching practices. In our sample, one group of researchers described their research as a self-study (Toll, Nierstheimer, Lenski, & Kolloff, 2004). As teacher educators engaged in teaching undergraduate literacy courses, they decided to become the researchers and the participants of their own research in order to study their influence on preservice teachers' beliefs and practices. Data sources included initial narratives written by each participant that described a teaching/learning incident, responses to these narratives, and a final composition that analyzed the literacy stories and responses. Toll et al. identified a number of conflicts in response to preservice teachers' beliefs and actions, including issues related to creating constructivist classrooms. Similar to the contributions of action research, self-study is an appropriate methodology for studying the professional development of teacher educators.

General Qualitative Methodology

More than half of the studies in our sample were categorized as *General*. The *General* category was applied to studies that stated the use of qualitative methodology without indicating a specific approach. For example, authors noting the use of longitudinal, qualitative methods (e.g., Borg, 2011; Taylor, 2003) were categorized as *General*. These are studies that Merriam (1998, 2009) would term *basic qualitative studies*, a type of qualitative research in which the researcher may "simply seek to discover and understand a phenomenon, a process, or the perspectives and worldviews of the people involved" (1998, p. 11).

Studies that noted the use of qualitative data collection strategies and analysis in the absence of a specific approach were also categorized as *General*. Examples included Ammah and Hodge (2005), Blay and Ireson (2008), and Delgado (2008) who noted the use of naturalistic observations and/or interviews. The majority of studies within this category did not describe the design of the study. Typically, these

studies included a heading for methodology, and then described setting, participants, and procedures without explicitly noting that the study employed a qualitative approach (e.g., Cantrell, Burns, & Calloway, 2009; Lotter, Singer, & Godley, 2009). The *General* category was also applied to studies that indicated a philosophical approach associated with qualitative inquiry. For example, Ganchorre and Tomanek (2012) and Chikasanda, Otrell-Cass, and Jones (2011) all indicated the use of an interpretive orientation.

Participants. Two-thirds of the studies categorized as *general* focused on practicing teachers, including teachers from the preschool level to teacher educators. Seventeen studies involved preservice teachers, and the remaining three studies included both practicing and preservice teachers. The majority of these studies utilized purposeful or convenience sampling. For example, McCallister and Irvine (2002) studied 34 practicing teachers who were enrolled in a multicultural professional development seminar (i.e., convenience sampling). Hodge, Ammah, Casebolt, Lamaster and O’Sullivan (2004) indicated that their sample of nine teachers was based on five criteria, including number of years of teaching experience (i.e., purposeful sampling). In contrast to purposeful or convenience sampling, participants in Namrata’s (2011) study were randomly selected.

Focus of inquiry. For both preservice and practicing teachers, the majority of the studies focused on a specific content area, such as reading, math, or science. Hart (2004), for example, studied eight middle school teachers in their first year of teaching in an urban school to see if their beliefs about teaching math changed. Almost a third of the studies on practicing teachers focused on their beliefs about particular learners. Sato, Hodge, Murata, and Maeda (2007) studied physical educator teachers’ beliefs about teaching students with disabilities and Hedge and Cassidy (2009) studied 12 kindergarten teachers’ beliefs about developmentally appropriate practice.

Data collection and analysis. A variety of data collection methods were used, including interviews, focus groups, classroom observations, and document collection (e.g., reflection logs, journal entries, teacher self-assessments, lesson plans, teaching portfolios, and personal philosophy statements). Almost half of these used more than one data source.

Analytic procedures were as varied as the data collection strategies, with most studies employing coding and categorizing techniques to analyze data for common patterns. Twelve studies purported the use of the constant comparative method. Jia, Eslami, and Burlbaw’s (2006) study of 13 ESL teachers’ perceptions of classroom-based reading assessments included observations, interviews and documents, which were analyzed using the constant comparative method. Jia et al. described a three-step process that involved open coding, grouping codes into larger categories, and then searching for patterns with the overarching categories. In a study of beliefs about technology and innovation, Davis, Hartshorne, and Ring (2010) also used the constant comparative method to analyze philosophy of teaching statements and journal entries from 51 first semester preservice teachers. They described their iterative process as a means of data reduction that helped them organize codes into emergent themes.

General qualitative studies with a quantitative component. Similar to case studies that incorporated quantitative components, there were two general qualitative studies that involved quantitative data collection or analysis. Brownlee, Walker, Lennox, Exley, and Pearce (2009) utilized an epistemological beliefs survey prior to conducting

in-depth interviews with 35 early childhood or primary teacher education students, while Zanting, Verloop, and Vermunt (2001) engaged in a homogeneity analysis of their qualitative data arising from structured interviews with 30 student teachers.

Contributions of general qualitative studies. Similar to the case studies reviewed, the general studies used multiple data sources; however, there was a greater variety of sources utilized in the general studies. For example, Ganchorre and Tomanek (2012) initially used preservice teachers' written responses to a questionnaire prior to utilizing interviews and focus group discussions as alternative methods to explore attitudes, experiences, and understandings that arose from the questionnaire. Bauml (2009) described the benefits of using multiple data sources in her study of preservice teachers' conceptions of effective teachers: "This design gave the preservice teachers an opportunity to richly articulate their beliefs about effective teachers beyond what can be ascertained via questionnaires or surveys, and it enabled me to ask clarifying questions to further my understanding of their responses" (p. 903). The use of multiple data sources has the added advantage of providing rich sources of data while complementing the strengths and weaknesses of each (Ozgun-Koca & Sen, 2006).

Several of the studies relied on the analysis of documents (students' reflective writings, philosophy of teaching statements, journal entries). One of the advantages of collecting documents for analysis is that it is relatively unobtrusive (Berg, 2007) especially when the documents are naturally occurring. Overall, the use of general methods were appropriate in order to understand and document the day-to-day reality of teachers' disabilities (Hodge, et al., 2004).

Across all 112 articles reviewed, we identified a number of methodological trends. These are summarized in the next section of the chapter.

METHODOLOGICAL TRENDS

Methodological trends were identified by comparing and contrasting patterns within the categories previously described and by noting the frequency with which codes were applied to a number of other categories.

More than half of the studies did not indicate a particular methodological orientation, and the majority of these failed to address research design. Of the studies that identified a specific qualitative methodology, case study appeared most frequently. Close to 70% of the articles cited between one and five methodological references. The remaining 30% were evenly divided between those not citing any methodological references and those citing more than five references. Overall, the majority of methodological references seemed dated, and newer editions of seminal methodological resources were rarely cited. For example, Sharan Merriam's book on case study methodology is widely regarded as an important resource in educational research (Creswell, 2013) and was cited in 23 of the papers in our sample. However, there were no references to the newest edition (2009) of this book.

With respect to participants, two-thirds of the studies examined practicing teachers' beliefs. These studies included practicing teachers at all levels of schooling, from kindergarten teachers to teacher educators. The remainder explored preservice teachers' beliefs at a number of stages in their education (e.g., first semester, student teaching), and four studies included both preservice and inservice teachers. More than half of the studies involved between one and 10 participants. We were

surprised to find that 21 studies included more than 30 participants. With respect to gender, the samples were primarily female. There were 10 studies that identified predominantly male samples. The majority of the studies involved participants in the United States. Approximately one-fifth of the studies reviewed were non-U.S. based, and included countries such as Taiwan, Singapore, Spain, Finland, and Australia.

CRITIQUE

In this section we begin by describing how qualitative methodologies contribute to the study of teachers' beliefs, and the challenges associated with adopting a qualitative approach. This is followed by a discussion of methodological issues that we observed as we conducted our review.

Contributions of Qualitative Research

Qualitative research contributes to the cumulative development of knowledge in the field by leading to "improved understanding of the complex and interrelated processes of personal experiences, beliefs, and practices" (Fang, 1996, p. 60). The complexity of the phenomenon under study demands equally complex methodologies, and the characteristics of qualitative research can respond to this need for complexity.

One of the strengths of qualitative research applied to the study of teachers' beliefs is that the methodology allows for prolonged data collection with a group of participants. This is particularly relevant when considering how teachers' beliefs develop and change over time, given that previous studies have shown that teachers' beliefs do not measurably change over a shorter period of time, such as a semester (Olafson, Schraw, Vander Veldt, & Ponder, 2011).

Another advantage of qualitative methodologies is that data collection typically occurs in natural settings (Creswell, 2013). Observing teachers in their classrooms, and seeing them behave and act in the context of their teaching allows researchers to move beyond reliance on self-reported forms of data. The use of classroom observations provides researchers with the opportunity to capture data related to instructional practices, which is an important consideration for researchers studying the relationship between teachers' stated beliefs and their practices.

A third advantage is that qualitative methodologies can lead to a more in-depth understanding of a phenomenon. From the data that is collected, qualitative inquiries produce rich descriptions of the context, the participants, and the topic of study (Merriam, 2009). This feature of qualitative research was noted by one of the studies in our sample: "The small number of participants provided the opportunity to deeply probe the research questions being studied. The power of the study relied on rich descriptions and patterns that described the participants' experiences" (Scharlach, 2008, p. 172).

Methodological and Interpretive Rigor

We structure this section of the critique using Fossey, Harvey, McDermott, and Davidson's (2002) criteria related to methodological and interpretive rigor: "The quality of qualitative research is determined by methodological rigor (good practices

in the conduct of research) and interpretive rigor (trustworthiness of interpretations being made). An important component of methodological rigor is transparency with respect to data collection and analysis, or the extent to which the processes of data gathering and analysis have been rendered transparent” (p. 724).

One good practice in the conduct of research and in writing the research report is to clearly identify a research design. This is applicable to qualitative research, according to Bogdan and Biklen (2007): “Qualitative researchers have a design: to suggest otherwise would be misleading” (p. 50). In our sample of studies, a clear description of research design did not appear to be related to the selection of a particular qualitative approach. Within all types of qualitative research, there were examples of both excellent and less than adequate explanations of the methodological approach. As a group, however, the phenomenological studies provided the most detailed accounts of methodology.

Regardless of approach, procedural choices made by researchers are not arbitrary: “Researchers must be able to make a case for what they did and did not do” (Smith, 1992, p. 103). Bullough and Pinnegar (2001) suggest that making a strong case for a methodological design includes a description of following the conventions of the chosen approach: “If a researcher can show that she has followed conventions with care, including recognized methods of inquiry, then she can assert the authority of her claims” (p. 15). Following the conventions of a particular methodology is a category of methodological rigor described by Fossey et al. (2002) as *congruence* with the research design. That is, the methods that are used are congruent with the stated methodology. It is difficult to assert the authority of claims, for example, if a study that purports to be phenomenological in approach fails to cite any seminal references, and instead provides references to case study. There were instances of lack of congruency in research design in the studies reviewed for this chapter.

With respect to data collection and analysis, *transparency* is another aspect of methodological rigor. Transparency refers to extent to which data gathering and analysis have been fully described, and an adequate description of analysis includes evidence of how the researchers utilized analytic techniques (Fossey et al., 2002). As noted throughout our chapter, there was a lack of transparency especially in regards to analysis.

Interpretive rigor is described by Fossey et al. (2002) as the extent to which the findings may be viewed as trustworthy. Trustworthiness refers to the soundness of the research (Marshall & Rossman, 2011) and was first described by Lincoln and Guba in 1985. Many of the methodological resources used to provide guidance in conducting qualitative studies included sections on “trustworthiness” (e.g., Corbin & Strauss, 2008; Creswell, 2013; Marshall & Rossman, 2011; Merriam, 2009). Approximately two-thirds of the articles reviewed for this chapter provided some discussion related to trustworthiness. For example, Tillery, Varjas, Meyers, and Collins (2010) described their procedures and cited Lincoln and Guba’s 1985 work: “Procedures such as member checking, reflexive journaling, peer debriefing, and persistent observation were utilized to ensure trustworthiness and credibility of results” (p. 90).

In Table 8.1, we highlight six studies that demonstrated methodological and interpretive rigor. These studies clearly identified and described the research design, and provided thorough descriptions of analytic procedures. In doing so, these authors made compelling cases for their methodological decisions, and provided a number of methodological references to further strengthen their case. The use of participant

Table 8.1 Exemplary Qualitative Studies

Authors	Approach	Focus of Inquiry	Participants	Noteworthy Aspects
Hancock & Gallard (2004)	Case Study	Impact of field experiences on the development of preservice teachers' beliefs	5 preservice teachers	<p><u>Methodological Rigor</u></p> <ul style="list-style-type: none"> - Multiple data sources utilized (drawings, interviews, worksheets, observation logs) with drawings selected as a way to quickly capture images of preservice teachers' beliefs. - Coding example provided. - Participants' drawings of images of learning before and after field experiences are included. - Detailed description for one of the cases is provided to illustrate concerns associated with belief development. <p><u>Interpretive Rigor</u></p> <ul style="list-style-type: none"> - Triangulation of data points (participants were interviewed after both drawings were completed).
Savasci & Berlin (2012)	Case Study (with quantitative component)	Science teachers' beliefs	4 practicing science teachers' beliefs and practices related to constructivism	<p><u>Methodological Rigor</u></p> <ul style="list-style-type: none"> - Interviews, demographics, survey, observations, and documents were analyzed using an inductive analytic approach. - Participants, school settings, and data collection clearly described. - Five categories of constructivist practice described, with examples from interviews provided. - A model showing the relationship between teachers' beliefs and practices is provided. <p><u>Interpretive Rigor</u></p> <ul style="list-style-type: none"> - Results from the analysis of interview data was triangulated with self-reported results from the survey. - Persistent observation, prolonged engagement with the context and the teachers, member checking, and multiple data sources were described as ways to establish credibility and trustworthiness.
Flowerday & Schraw (2000)	Phenomenology	Beliefs about the use of instructional choice in the classroom	36 classroom teachers	<p><u>Methodological Rigor</u></p> <ul style="list-style-type: none"> - In-depth interviews were coded and themes established, following procedures outlined by Moustakas. - Themes were analyzed to provide a structural description of teachers' beliefs about instructional choice. <p><u>Interpretive Rigor</u></p> <ul style="list-style-type: none"> - Five steps were taken to triangulate the data, including a member-check phase in which classroom teachers who did not participate in the interviews were asked to provide their feedback on the main findings to ensure that final results were consistent with teachers' beliefs and classroom experiences.

(Continued)

Table 8.1 (Continued)

Authors	Approach	Focus of Inquiry	Participants	Noteworthy Aspects
Lin, Gorrell, & Silvern (2001)	Grounded theory	Professional beliefs about teaching and learning	298 Taiwanese preservice teachers'	<p><u>Methodological Rigor</u></p> <ul style="list-style-type: none"> - Engaged in initial coding for emerging concepts, and concepts were then divided into six categories that became themes. - Created diagram of relationships. <p><u>Interpretive Rigor</u></p> <ul style="list-style-type: none"> - Repeated independent coding to achieve consensus. - Conducted focus groups to confirm emergent themes.
Leavy, McSorley, & Bote (2007)	Action Research	Preservice teachers' beliefs about teaching and learning	124 preservice teachers	<p><u>Methodological Rigor</u></p> <ul style="list-style-type: none"> - Data sources included metaphor construction, reflective journals, focus groups. - Metaphors were used as a tool to gain access to preservice teachers' beliefs. - Participants constructed metaphors of teaching at two different points in their program. Metaphors were categorized and examined for changes that occurred. <p><u>Interpretive Rigor</u></p> <ul style="list-style-type: none"> - When the researchers could not reach consensus during coding they asked participants to provide further clarification. - Categories were triangulated across various data sources and across time.
Ozgun-Koca & Sen (2006)	General	Perspectives on effective education	51 preservice teachers in Turkey	<p><u>Methodological Rigor</u></p> <ul style="list-style-type: none"> - Data sources included concept-mapping, journal writing, and interviews before and after student teaching. - Use of concept maps as the main data source allowed researchers to study the relationships among four key educational concepts (teacher, teaching, student, and learning). - Figures of students' concept maps, before and after student teaching are included. - Interviews were conducted after document analysis to minimize misinterpretation of students' journal writing. <p><u>Interpretive Rigor</u></p> <ul style="list-style-type: none"> - In face-to-face interviews, data and interpretations were presented to participants to ensure trustworthiness. Member check questions were included in the interview.

data (i.e., drawings, interview excerpts) to demonstrate coding decisions was a technique used in these papers that led to increased transparency. These six studies also provided discussion related to the trustworthiness of the findings.

CONCLUSION

As noted elsewhere in this volume, studying the beliefs and practices of teachers presents a number of methodological issues regardless of research design. Perhaps the greatest issue facing qualitative approaches is the need for methodological clarity. Enhancing methodological clarity begins first with a clear description of research design. Additional focus on research design is required of all approaches, including those other than the traditional methodologies. In building a rationale for research design, the use of appropriate methodological references should be considered. As indicated earlier in this chapter, methodological references were not provided in approximately 15% of the articles. It is likely not a coincidence that these papers also failed to adequately describe research design. Secondly, methodological clarity can be improved through greater transparency when describing data collection methods and analysis of data. We believe that transparency is particularly important with respect to analysis. In the absence of knowing how the researcher has reduced masses of qualitative data into categories, themes, or significant statements, it is very difficult to evaluate the believability of claims that are made. Greater transparency, however, might be a source of tension between authors and journal editors as word limits and space constraints may limit the author's ability to provide a full description of analytic techniques. Finally, criteria for evaluating the quality of research should be reviewed by researchers prior to beginning a study, and should also be addressed within their final reports. As suggested by Fossey et al. (2002) these criteria offer guidance about conducting sound research.

Although we identified a number of methodological issues, we remain convinced that qualitative approaches have much to offer the field. The development of complex, detailed understandings about the ways in which teachers develop, change, and act upon their beliefs in their classrooms requires the use of qualitative approaches in which researchers can attend fully to the lived experiences of teachers.

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9

METHODS FOR STUDYING BELIEFS

Teacher Writing, Scenarios, and Metaphor Analysis

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Defining teacher cognition, knowledge, and beliefs as essentially interchangeable terms, more than 20 years ago Kagan (1990) identified “five alternative approaches to measuring teachers’ cognitions: (a) direct and noninferential ways of assessing teacher belief, (b) methods that rely on contextual analyses of teachers’ descriptive language, (c) taxonomies used to assess teachers’ self-reflection and awareness of problem-solving strategies, (d) multimethod evaluations of teachers’ pedagogical content knowledge, and (e) concept mapping techniques” (p. 422).

Based on her review and hoping to encourage further study of teacher cognition and belief, among Kagan’s conclusions were that the most successful studies “used techniques that yield qualitative, molar descriptions” of teacher cognition and belief and that “multimethod approaches [appeared] to be superior . . . because they are most likely to capture the complex, multifaceted aspects of teaching and learning” (p. 459). To be sure, qualitative studies focused on teachers’ beliefs have grown dramatically since Kagan’s statement; most studies now draw on more than one data source, and many combine research methods. It seems remarkable that in Kagan’s review and discussion no mention was made of biography, autobiography, or life history, or of how beliefs form and develop over time, nor was attention given to the contextual nature of beliefs and of how context informs not only what is believed but what may be spoken and how or even if beliefs are enacted.

As the cognitive revolution grew in influence in education through the 1970s and 1980s and as constructivism captured the imagination of growing numbers of educators, tremendous energy was directed toward developing research methods for exploring teacher thinking, development, and change—and secondarily as means

for encouraging and focusing teacher reflection. The result has been that since Kagan's review the methods used to study teachers' beliefs have evolved in several directions and greatly expanded. Beliefs, like knowledge, have come to be understood as situated, grounded in specific contexts and practices, and, operating with differing intensities and levels of commitment, capable of shaping interpretations of events, thereby "[disposing] people toward particular actions" (Ambrose, Clement, Philipp, & Chauvot, 2004, p. 62).

The purpose of this chapter is to explore three of these recent developments, each representing less a specific research method than a family of strategies sharing a phenotype. The first is the dramatically expanded place of teacher writing of various kinds, most especially including biographical writing, in studies of belief; the second is the use of scenarios; and the third, noted by Kagan in its emergent stages, the exploration of teachers' beliefs through the analysis of teacher and teaching metaphors. Situated historically, features of each family will be described, and based on an extensive literature review, variations in approach and in usefulness will be considered. Along the way, it will become apparent that Kagan was prescient in her assessment of the value and anticipated future of "multimethod" approaches to the study of teachers' beliefs.

TEACHER WRITING

Teacher writing has assumed a prominent place in studies of beliefs. Forms vary and the literature is now large. Life histories, autobiographies, teacher journals of various kinds—diaries, blogs, and logs—and short responses to written problem situations or scenarios, are now abundant. Besides writing in ways that open beliefs to exploration by researchers and frequently methods course instructors, teacher education students and teachers often find themselves engaged in the analysis of their own or of their peers' written works. Complicating the task of making sense of this literature, pedagogical and researcher aims blend together.

Although when reading the literature of education, the areas of narrative and textual analysis may seem to be recent developments, nothing could be further from the truth (Hsu, 2008). Stories have always been part of human experience, particularly as humans seek to understand themselves and the world they inhabit. Narratives ground identity (see Beauchamp & Thomas, 2009); they convey belief and unite a people. Textual analysis—seeking the meaning of a text—reaches far back in human history and in the form of biblical exegesis has profoundly shaped what is understood to be the West and Western sensibilities. Interrogating stories through case analysis was and is the essential task of psychoanalysis, with the aim to re-story the self (Freud, 1920/1935). Changing beliefs about self and the world is the stuff of religious conversion—an embrace of new narratives.

Among educators, informally and formally, stories have long been used as data. Case studies of children published by Zachry (1929) and Blos (1941), both associated with the Eight-Year Study (Kridel & Bullough, 2007), provided a basis for thinking through why children behaved as they did and for challenging teachers' beliefs about children and rethinking teacher actions. Over the past several years, narrative inquiry has matured (Clandinin & Connelly, 2000), and its influence within education has grown dramatically.

Life Writing: Autobiographies and Life Histories

In calling for “designs and methodologics that enable us to address the ‘whole’ of teachers’ mental lives,” Woolfolk Hoy and her colleagues pointed to a bias in educational psychology toward “intraindividual processes” (2006, p. 730). What tends to be missing in such studies is focus on the social and cultural contexts that shape teacher thinking and belief. This section will discuss forms of life writing that tend to emphasize cultural and historical context, followed by a section on methods that lean more toward an “intraindividual” psychological orientation.

Influences on life writing in education that point toward the importance of context and culture in thought and belief are many and diverse. From sociology came the seminal work on the Polish peasant of W.I. Thomas and Florian Znaniecki (1918) and John Dollard’s remarkable work, *Criteria for the Life History* (1935). Much later came Erikson’s series of life history studies, each illustrating how the “personal coherence of the individual and role integration in his group” are complemented by “his guiding images and the ideologies of his time” which, in turn, are grounded in “the historical moment” (1975, p. 20). On this view, to understand beliefs necessitates situating biography in history and culture, which is the promise of life history research: “Moving from life story to life history involves a move to account for historical context” (Goodson & Sikes, 2001, p. 17).

Ivor Goodson (e.g., Goodson, 1980; Goodson & Sikes, 2001) has done much to bring the life history to the attention of educational researchers. These efforts found support in the early autobiographical studies of reconceptualist curriculum theorists, although much of this early work was focused on uncovering personal working assumptions and thus shared elements of the “intraindividual” bias noted above. Nevertheless, embedded in some of this work was a criticism of the cultural and political life of the 1970s. Similar concerns have been expressed about the autobiographical strain of self-study research (Bullough & Pinnegar, 2001; Bullough, 2008). Clearly, the most powerful studies attend in one or another way to the contexts within which beliefs form.

Examples of the many species of life writing that attend to context are abundant in the wider education literature. Subedi (2006) required of her students a “cultural autobiography on how they had come to understand differences, particularly the religious dimensions of differences” (p. 230). She examined teacher education student papers to gain insight into how they “understood the needs of diverse learners in schools” (p. 230). From the perspective that beliefs form early, are often grounded in a teacher’s experience of schooling, and frequently are negative, numerous studies have focused on attitudes toward and beliefs about teaching and learning, particularly related to mathematics, and changes in those beliefs. Stuart and Thurlow (2000), for example, required their students to write a “mathematics autobiography beginning with their earliest memories” (p. 115). As in many other studies (Bullough, 1991), “autobiographies became the basis for exploring early experiences and served as a starting point for ongoing examination of connections between . . . experiences, perceptions, and beliefs” (Stuart & Thurlow 2000, p. 115). Similar studies have been conducted in various subject areas including science (Smith, 2005) and foreign language learning (Leshem & Trafford, 2006; Numrich, 1996).

Among the more interesting developments in the educational uses of life writing is the study by teacher educators of their own beliefs about teaching and learning and their origins. Along this line Pinnegar (1995) wrote an autobiographical account of the place of “beginnings” in her life and in her professional development and explored how these experiences shaped her work in teacher education. Generally researcher analysis of life writing focuses on identifying the experiential origins and patterns of belief and changes in those patterns, although taxonomies, about mathematics teaching and learning, for example, are sometimes employed.

Journals, Diaries, Blogs, and Logs

Journals, diaries, blogs, and logs represent additional forms of teacher life writing that find place in the research on teachers’ beliefs. Like autobiographies and life histories, these often serve a dual purpose as data for researchers seeking insight into teachers’ beliefs about a topic and as a form of pedagogy that encourages and focuses authors’ inquiry into their own beliefs and practices—a form of self-study research. Researchers often study teachers as they generate and interact with journals, diaries, blogs, and logs seeking to identify the effects of these processes and products on teacher thinking and development in some domain, with an eye toward improving teacher education programs and practices.

Keeping a journal or diary is a common human pastime. Through the 1970s, as the self-development movement got underway, interest in journaling as a means for personal growth, for getting in touch with the self, in fact as a means for discovering the self, grew. The work of Progoff (1975), including what he described as the “intensive journal” process and program, is illustrative. To generate data, journal writers following Progoff’s model employ a set of tested methods for developing the evolving text and then interrogating it. Underpinning this work is the assumption, present in much of the educational use of journaling, that self-evaluation is the most powerful form of assessment. By the 1990s journals and journal writing as data for researchers had gained a place in many fields including counseling, psychology, nursing, management, leadership, sociology as well as teaching (Bain, Ballantyne, Packer, & Mills, 1999).

At some point when writing becomes extensive, a line is crossed and a log or even a blog becomes a journal. Seeking to explore the consistency of behavior and belief in mathematics, this boundary was approached in a study by Hart (2002). In addition to a set of instruments assessing student beliefs, Hart examined weekly participant logs kept during field placements and student teaching: “[Students] analyzed their experiences in teaching mathematics. They were required to describe a math experience . . . and to answer four questions about each experience. What was hard about the lesson/experience, etc.? What was easy? What did I learn? What would I do differently next time?” (p. 7).

Upon establishing a niche in teacher education and in education research, journaling rapidly expanded and assumed many different configurations. To get at specific issues or concerns, some writing was highly structured and carefully guided (Chitpin, 2006). Other studies were loosely organized (Cole, Raffier, Rogan, & Schleicher, 1998), structured primarily by the author’s choice of something as worth writing: for example, student teaching experiences. Journaling that lacked clear

focus sometimes has proven disappointing (Many, Howard, & Hoge, 2002). Formats also varied, from blogs and emails to traditional paper exchanges between a teacher and a student or among students. Some documents were the work of individuals, while others involved students writing and exchanging what they had written. While most logs were written, not all involved writing, but simply required daily responses to multiple choice and forced response items to track changes in belief over time (Forbes & Davis, 2010).

By describing three types of journals, Wilson, Hine, Dobbins, Bransgrove, and Elterman (1995) helpfully mapped part of the terrain, each type representing a different form of student data analysis and mode of inquiry: student/tutor interaction, dialogue journals, and critical groups or communities of inquiry. Student/tutor interaction involves journals written by students and read by their teachers. Instructor feedback and questions are intended to move the journal authors' thinking along, deepening their understanding of teaching and learning and of their own values and beliefs.

Dialogue journals involve written interactions between the journal writer and one or more readers, including peers. The intention is to engage in rich and intense conversation in which respondents may pose questions "about the student's assumptions or arguments, ask for clarification, provide alternative perspectives, or question the implications of the views for educational practice" (Wilson et al., 1995, p. 167).

Journaling of critical groups, which Lee (2007) described as "collaborative/interactive group journals" (p. 322) and what Cole, Raffier, Rogan and Schleicher (1998) call Interactive Group Journals, have been used as a basis for discussion by students with the aim of building and strengthening a sense of community. In these journals, students engage in cycles of writing, responding, and discussing what has been written, seeking deeper insight into their values and beliefs and greater engagement with their peers.

Strengths and Weaknesses of Research Using Teacher Writing

As a data source about teachers' beliefs, the various forms of teacher writing have both strengths and weaknesses. Additionally, they raise serious ethical considerations for researchers.

Fendler (2003) observed that among the potential strengths of life writing is that it opens up for teacher education students, teachers, and researchers "the ways in which . . . experience affects [perception of] teaching and learning" (p. 22). Writing autobiographies, life histories, and journals "legitimate[s] the personal voice of the writer" (p. 22). In addition, life writing may encourage reflection and serve as a "signpost" of a "learning journey" (Sidhu & Kaur, 2010, p. 48) for students and for teacher educators who themselves may engage in life writing and journaling. This outcome is evident when the products of reflection have been collected for analysis into portfolios (Mansvelder-Longayroux, Beijaard, & Verloop, 2007) or personal teaching texts (Bullough, 1993). By revealing how beliefs evolve and change over time, life writing and focused journaling hold potential for elucidating how all change is biographically and historically grounded and for locating strengths in teachers' world views that support learning. Moreover, life writing can open to

view moments that represent the maturing of a teacher's knowledge and beliefs (see Bullough & Baughman, 1997).

Several authors have noted potential weaknesses and even dangers in life writing, dangers that go well beyond the importance of full disclosure to students when seeking permission to use their work for research purposes. Goodson and Sikes (2001) locate one of these dangers in the "colonizing power" (p. 17) of researchers to situate life stories in larger cultural stories and contexts and thereby appropriate stories as their own. Life writing often makes writers vulnerable, encouraging them to manage their stories in self-protective ways. Studying teachers' beliefs and changes in beliefs among their students increases the likelihood that researchers will succumb to the dangers of "confirmation bias" (Allen & Coole, 2012, p. 387), of finding in a study what they are able to see and reporting strategically selected events and episodes. A related risk is that life writing may "re-circulate and reinforce existing stereotypes," judgments widely accepted as essential elements of an acceptable story-line with the result that no new insights emerge but dominant patterns of thought and belief are confirmed (Fendler, 2003, p. 22). What follows may be only a conventional story bounded by personal preferences or essentialized categories: race, class, gender. Reflection on self is hard emotional work and some students and teachers are very resistant (see Akbari, 2007). Finally, life writing has all the strengths and weaknesses of self-reports with the additional challenge of being wholly dependent on memory and on the author's ability to compellingly write, structure, and tell a story.

Journaling—when frequent entries are written over an extended period of time—has the virtue of offering data that enable exploration both by teacher education students and more formally committed researchers of the development and change in thinking. Moreover, when effectively guided (explicit focus is crucially important), such writing offers the possibility of exploring teacher change in relationship to emotion, including feelings about what is transpiring in a teacher's personal and professional lives (Debreli, 2011). When focused on unfolding events, like life writing, journaling can open for consideration contextual influences on beliefs: What is happening? Who was involved? Why? With what results?

Despite these strengths, journaling brings with it all of the weaknesses associated with self-report data noted above in the discussion of life writing. As Lee (2007) has observed, students often find difficulty maintaining interest in journal writing, thus weakening the quality of its data. Some students simply prove resistant to writing (Freese, 2006). In Wickstrom's (2003) study students participating in an open web-based forum found publicly sharing their thoughts to be threatening. For good or ill, some bloggers betray no such sensibilities. Lack of time for writing while engaged in intensive field work also can prove challenging, resulting in wide variability from study to study in the number and quality of student journal entries.

Wilson and his colleagues (1995) noted an additional difficulty, the challenge for instructors of responding effectively to the volume of journals and journal entries received. For researchers, the barrage of materials requiring analysis and response can prove overwhelming, sometimes impossible. Focus, as noted, may also prove troubling. Howard and Hoge (2002), for example, concluded from their study that when journaling is too loosely organized students may conclude that it is a "waste of time" (p. 318). As Debrili (2011) observed, unguided journaling results in a

“considerable amount of irrelevant information [being] recorded” (p. 63). Yet when too focused, entries may lack richness and important insights may be missed.

Logs, like journals, diaries, and blogs, provide a means for gathering data consistently over time, offering a potential response to the shortage of longitudinal studies in the wider literature. As noted, logs sometimes take the form of quick responses to a set of questions that may only involve a rating, ranking, or forced choice—each taken to indicate something meaningful about how a teacher’s thinking is developing or changing over time. That logs are usually much shorter than journals or diaries is both a strength and a weakness. The strength is that logs are more likely to be completed; the weakness is that the data may not very rich.

SCENARIOS

Scenarios take many forms: written (Ravindran, Greene, & DeBacker, 2005; Tillema, 2000), spoken as part of an interview (Empson & Junk, 2004; Holt-Reynolds, 2000; Rothbaum, Nagaoka, & Ponte, 2006), or video (Ambrose, Clement, Philipp, & Chauvot, 2004; Forrester, 2008; Yadav & Koehler, 2007), including clips of subjects’ own classroom teaching (Speer, 2005). Here understood as a real or imagined account or synopsis of an event, scenarios can be represented almost interchangeably by a number of terms: *incident*, *critical incident*, or *simulated incident*, *case*, *dilemma*, *issue*, *episode* or *vignette*, and *situation*. The roots of scenario use in education research are multiple and fragmentary, spreading out in diverse directions across multiple fields.

Incidents

The *critical incident technique* was introduced into social science research by Flanagan (1954) following research begun during World War II. Seeking to identify individuals well suited for a range of war-related roles, an effort was made to locate through observation specific incidents characteristic of effective and poor quality performance and to document how individuals responded in these situations. As Flanagan wrote: “the critical incident technique is essentially a procedure for gathering certain important facts concerning behavior in defined situations” (p. 335). Over time, reports of critical incidents replaced observation of them (Gremler, 2004). Often, in writing or in interview, research subjects identify critical incidents which are then analyzed, organized, and perhaps rewritten for use by researchers to gain understanding of how a target population or individual thinks about, feels about, and would respond to the incident. Scales may be used to report the range of responses to the incidents, thus revealing differences in belief.

Critical Incidents in Teaching (1964), edited by Corsini and Howard, offered an early use of critical incidents in education. Anticipating later work in case analysis, the editors solicited from teachers a large number of teaching incidents, eventually selecting 50 for analysis by experts in teaching. Corsini and Howard intended that beginning teachers think about the incidents in terms of a range of guiding questions designed to reveal how the problem or issue represented by the incident was understood and then were to compare their thinking to the experts. One aim of the exercise was to build knowledge about teaching; another was to “[clarify the

reader's] point of view regarding the specific critical incident under consideration" (p. xxi). The editors' concern was pedagogical; only later would responses to critical incidents be thought of as research data useful for gaining insight in teachers' beliefs. The same is true of *simulated incidents*, such as the 32 composing the *Inner-City Simulation Laboratory* (Cruickshank, 1969). An important step toward treatment of scenario responses as research data capable of opening the inner world of teachers came with the growing influence of the work of Lawrence Kohlberg.

Dilemmas

Kohlberg's staged theory of moral development grew out of his attempt to make sense of children's responses to a set of hypothetical moral dilemmas. As the theory developed, his interest turned to the question of what teachers and schools could do to stimulate moral development, including how teachers thought about moral issues. To this end, he concluded, "The teacher must help the student to consider genuine moral conflicts, think about the reasoning he uses in solving such conflicts, see inconsistencies and inadequacies in his way of thinking and find ways of resolving them" (Kohlberg & Hersch, 1977, p. 57). As Kohlberg (1966) argued,

Exposure to the diversity of moral views of teachers is undoubtedly one of the enlightening experiences of growing up, but the present system of thoughtlessness [in schools] as to which of the teacher's moral attitudes or views he communicates to children and which he does not leave much to be desired. Many teachers would be most mortified and surprised to know what their students perceive to be their moral values and concerns. (p. 18)

While Kohlberg's research focused on how children and adults reasoned morally, the place he and others such as Rest (1979) gave to the use of moral dilemmas and responses to those dilemmas as data dramatically expanded the range of methods found useful for exploring human thought and action.

An additional word about Rest's research is needed, his Neo-Kohlbergian approach to moral development and the Defining Issues Test (DIT). Although closely related, the two approaches differ in several significant ways of interest to this discussion. Kohlberg relied on *moral judgment interviews* to access respondent's reasoning about moral dilemmas. In contrast, the DIT measures stage shifts at the upper half of Kohlberg's model similar to many of the studies falling into Kagan's third category of methods, those utilizing taxonomies. Subjects read a moral dilemma and on a Likert-type scale rate and rank a set of corresponding statements on their moral importance. As Narvaez and Bock (2002) argued, drawing on relatively recent insights from cognitive science, that in requiring explanations for reasons given, Kohlberg's model assumes that "participants make their moral judgements reflectively, that they are able to articulate them, and that the method can be 'error free'" (p. 297). Yet as these authors noted, cognitive processes are heavily influenced by experience, and decisions often occur without awareness and draw upon knowledge that is tacit (Polanyi, 1958). Moreover, the processes involved in decision making are implicit. "Research on implicit decision-making calls into question the privileged place of interview data (dependent on conscious understanding) over recognition

data (dependent on implicit understanding, as in the DIT)” (Narvaez & Bock, 2002, p. 299). The DIT activates unconscious schema, involving “expectation-based processing” (p. 302) that function as “mental models . . . for reasoning about moral dilemmas” (p. 305). By tapping schema (as beliefs function in schema-like ways in human thought), the DIT reveals much about the underlying implicit beliefs that inform respondents’ decisions.

Issues, Episodes, Vignettes, and Situations

Two additional developments of the 1960s are pertinent here, each arising as responses to dramatic cultural and political changes and heightened social conflict, and each centering on the exploration of beliefs. The first is *values clarification* (Raths, Harmin, & Simon, 1966), which involved the exploration by students and teachers of issues of various kinds. Rather than directly teach values, the aim was to engage in a “particular *valuing process* and to apply that process to value-laden areas and moral dilemmas in [life]” (Kirschenbaum, Harmin, Howe, & Simon, 1977, p. 743). The model is based on the assumption that all decisions involve values, and values imply beliefs.

The second development grew out of a rather dramatic shift in ethics teaching during the second half of the twentieth century. As Giarelli (1982) observed from his analysis of changes in standard ethics textbooks, there was a shift in moral philosophy to which textbook authors were compelled to respond. He summarized these changes by stating:

they all [mark] a broadening of the scope of ethics to include, and be based on, conflicts of practical judgment, an increased attention to and awareness of the psychology of moral learning, a commitment to teaching ethics rather than about ethics, and a translation of these ideas into texts organized around educational, rather than disciplinary, considerations. (p. 333)

Suddenly, textbook authors were charged with making their cases—episodes, vignettes, and situations—and their arguments *relevant* to the times (after all, issues change over time) and *inductive* forms of analysis increasingly came to replace *deductive* forms. Rather than apply principles to cases, researchers used analysis to generate principles in support of believing.

Strengths and Weaknesses of Scenarios

Scenarios in various forms and teacher responses to them have found an important place in research on teachers’ beliefs. In addition to enabling research, scenarios also have been used to help make beliefs explicit and to encourage reflection on those beliefs. The aims are complementary reflection is embedded in the very process of considering then responding to scenarios.

Scenarios have proven especially helpful for exploring the situated nature of beliefs (Hoyle, 1992; Prawat, 1992). In addition, as Gill, Ashton, and Algina (2004) have noted, the method may provide richer data than self-reports of teachers’ beliefs. As these authors concluded, “Teaching scenarios are a first step in examining belief

change that more accurately reflects preservice teachers' underlying beliefs than self-report" (p. 179). Following changes in teacher response to a set of scenarios over time has proven useful for gaining insight into changes in understanding. In addition, scenario studies have been used to demonstrate aspects of how beliefs function in thinking. Yadav and Koehler (2007), for example, found that as preservice teachers viewed a set of video clips of teaching, prior beliefs about knowledge predicted how the clips were perceived and which were selected as representative of best teaching practices.

Yet crafting scenarios that get at the richness and complexity of teachers' beliefs with minimal distortion is extremely difficult. Drawing on studies of teachers' beliefs about diversity, Santoro and Allard (2008) helpfully described some of the difficulty faced when crafting scenarios for research. These authors turned narratives from teacher interviews and focus groups into scenarios useful for stimulating reflection about beliefs. While their conclusions may not capture all the potential educational uses of scenarios or the challenges involved in scenario construction, they helpfully framed the task. They also suggested some standards for scenario writing. Namely: (a) Scenarios "should be 'realistic' and reflective of situations that practitioners are likely to encounter in their particular fields." (p. 174); (b) They "must be sufficiently 'removed' from the participants' personal contexts . . . that [respondents] have the option to *voluntarily* [identify] with the scenario" (p. 174) (For studies intending to reveal teachers' beliefs by identifying a preference for one or another course of action described in a scenario, this particular guideline may not prove useful); and (c) They need to "resonate with a range of participants on an individual level [and] must incorporate multiple perspectives which participants can draw upon in relation to themselves" (p. 174). More simply, respondents must be able to put themselves into the scenario, seeing themselves as engaged in the actions described.

Additional difficulties are associated with scenario origins and form or presentation. Some scenarios are imaginative creations written by researchers (e.g., Gill, Ashton, & Algina, 2004); others are drawn from research studies designed to capture reported teachers' beliefs, frequently from interviews with teachers (Arbeau & Coplan, 2007); and sometimes teachers are asked to write them as in *Critical Incidents in Teaching* (Corsini & Howard, 1964), noted above. None of the three approaches guarantees that the scenarios created will meet the standards set by Santoro and Allard (2008) or speak sensitively to changing times and shifting cultures. That teachers have written a set of scenarios does not mean the scenarios will be of genuine concern to other teachers working in different contexts or that the range of actions allowed by or called forth by a scenario is sufficiently broad to capture the most essential teachers' beliefs.

With each form of scenario, interpretative difficulties may and often do arise, even when there is agreement about the essential elements of the situation portrayed. For example, while scenarios have found a firm place in studies designed to explore inconsistencies between teachers' beliefs and actions, some researchers have raised fundamental questions about such studies. In a provocative piece, Speer (2005) noted that there are abundant reasons for inconsistencies in professed and attributed beliefs and practices, an issue of enduring importance (Fang, 1996; Marcos & Tillema, 2006), notably including the risk that teachers do not share researchers'

language or understanding. Resulting conclusions, she suggested, are impositions: “All beliefs are attributed to teachers by researchers” (Speer, 2005, p. 387). Making a parallel point, Basturkmen, Loewen, and Ellis (2004) argued that not only may teachers lack the language needed to express their beliefs, they “may be unwilling to express any unpopular beliefs they hold, preferring to state beliefs viewed as socially desirable” (p. 249).

In a study of teachers’ beliefs about reading comprehension and ways children learn to read, Richardson, Anders, Tidwell, and Lloyd (1991) were unwilling to conclude teachers beliefs were inconsistent, choosing instead to state that they found “seeming contradictions” (p. 575): statements of belief that could be interpreted in multiple ways not revealed by the research. Their results, they suggested, could have arisen because of differences in researcher and teacher analytic frameworks, and so “the statements may not be contradictory at all” (p. 576). In part, the concern about inconsistency may merely represent recognition that beliefs operate at different levels and with different force, and of how differing situations may call up different aspects of a teacher’s belief system. In grading, for example, when viewed through the perspective of actual practice, belief in rewarding effort may only seem to clash with an equally robust belief in honoring outstanding student performance (Brookhart, 1994).

METAPHORS AND BELIEFS

A simile is an explicit comparison; a metaphor an implicit comparison. “In a simile we say explicitly that one thing is like another; in a metaphor we simply speak of one thing as though it were another . . . [Metaphors] are a kind of concealed analogy” (Green, 1971, pp. 57, 60).

Since the linguistic turn in philosophy in the later half of the twentieth century, which recognized metaphors as essential elements to all language and communication, this form of analogy has received a great deal of research attention. As Gurney (1995) argued, metaphor grounds what Wittgenstein (1953) called “first language”: “original world-views” that are tacit and “fundamentally experiential” (Gurney, 1995, p. 571). Over time, interest in education-related metaphors has increased. The argument has been straightforward: Behind every educational decision reside “root metaphors” (e.g., teaching is transmission) operating as “metaphysical premises” (Bandman, 1967, p. 111) which, in tacitly shaping thought and action, have required critical analysis (Scheffler, 1960). This philosophical interest has been joined by a psychological interest, similarly rooted in the growing influence of the cognitive sciences and their concern with problems of meaning and meaning making (Ortony, 1975). Of particular importance for psychologists was schema theory, with its emphasis on the place in teacher thinking of what Clark (1988) described as “implicit theories” (p. 6) or preconceptions. An additional although weaker interest came from sociology, particularly from symbolic interactionism: “The first premise [of symbolic interactionism] is that human beings act toward things on the basis of the meanings that the things have for them” (Blumer, 1969, p. 21). Metaphors, particularly root metaphors, operate as implicit theories, loose schemas, that shape how the world of people and things is understood and establish boundaries for

meaning making, including about self and other (Bullough, in Bullough, Knowles, & Crow, 1991, introduction).

Publication of *Metaphors We Live By* (Lakoff & Johnson, 1980) galvanized and focused attention on the place of metaphors in language and action, strongly encouraging exploration of how metaphors might be studied and perhaps even changed. For many educators, Lakoff and Johnson's argument for the place of metaphors in understanding human experience and changing beliefs proved compelling. As Connelly and Clandinin (1988) wrote, "Let us modify Lakoff and Johnson's title to read 'Metaphors We Teach By'" (p. 71).

New metaphors have the power to create a new reality. This can begin to happen when we start to comprehend our experience in terms of a metaphor, and it becomes a deeper reality when we begin to act in terms of it. If a new metaphor enters the conceptual system that we base our actions on, it will alter that conceptual system and the perceptions and actions that the system gives rise to. Much of cultural change arises from the introduction of new metaphorical concepts and the loss of old ones. (Lakoff & Johnson, 1980, p. 145)

Cook-Sather (2003) nicely set the problem: "a root metaphor must be dug up to be discerned" (p. 951). But how to dig them up?

Metaphor Analysis

Mapping the terrain. Numerous studies have been conducted seeking to identify the metaphors embedded in teacher thinking, particularly of preservice elementary teachers. Several studies have been conducted to identify metaphors or dominant types of metaphors held by teachers. Typically two purposes have driven these studies, to "make it easier for student teachers to become aware of the nature of teaching through metaphor-based reflection [and] to facilitate and simplify research work related to the use of metaphors" (Chen, 2003, p. 25). The first purpose points toward links between beliefs and the enactment of teacher roles (Bullough, 1992; Tobin, 1990). In a study of 253 students certifying in either elementary or secondary teaching, Mahlios and Maxson (1998) identified four "dominant" metaphors: teaching as guiding, teaching as nurturing, teaching as stimulating, and teaching as telling. In a large Turkish survey study Saban, Kocbeker, and Saban (2007) identified six dominant metaphors for teaching, the most common ones being "teacher as knowledge provider (student as passive recipient of knowledge)" (p. 128) and "teacher as molder/craftsperson (student as raw material)" (p. 129), which together accounted for 51% of the responses.

Literature of this kind has found place in numerous studies, usually involving a survey or questionnaire designed to identify how a teacher thinks about one or another aspect of teaching. For example, Alger's (2009) literature review identified six dominant teaching metaphors: "Teaching is Guiding, Nurturing, Molding, Transmitting, Providing Tools, and Engaging in Community" (p. 744). After defining these metaphors, Alger developed an email survey that was distributed to over a thousand secondary school teachers, with questions designed to elicit information about changes in beliefs over time as well as currently desired views of teaching.

Along a roughly similar line Massengill, Mahlios, and Barry (2005) developed a questionnaire that asked beginning teachers to check from a list a metaphor that best described their experience of school. Respondents were then to give reasons for the selection, complete a self-esteem scale, identify a metaphor for life and childhood, and then generate a personal metaphor for teaching. During their first full year of teaching the participants were observed, and lessons audiotaped and transcribed to identify metaphors in use. Later the survey was revisited and answers revised if participants wished. Of the 50 teachers, 5 were interviewed, each representing a different content area. Brief cases were written to capture development over time in the thinking and experience of the five interviewed teachers. This study produced metaphors not only for teaching but for school (“family,” “team,” and so on); life (“trail,” “river,” and so on) and childhood, supporting the claim made by Green (1971) that beliefs are not singular, but are organized into systems as are metaphors. In another study the same team of researchers (Massengill et al., 2005) identified metaphors that described “preservice teachers’ sense of teaching” (p. 41) and made comparisons across elementary, English, and foreign language majors. Few differences were found; the most common metaphor for each of the three categories was “nurturer.” Finally, identifying metaphors occasionally finds a place as an item in belief questionnaires such as the Open-Ended Teaching Belief Questionnaire (Buehl & Fives, 2009).

Analyzing discourse. In addition to questionnaires, numerous studies have involved some type of analysis of teacher language—written and spoken. For example, Dooley (1998) located a student teacher’s dominant metaphor, “teaching is a two-way street,” by analyzing journal entries, field notes of observations, the student’s reactions to a videotaped lesson, and audio-taped interviews. She watched as the student teacher struggled to realize in practice his beliefs about teaching, being unable to give students more responsibilities and more say over the curriculum. Pinnegar and her colleagues (2011) conducted a sociolinguistic analysis of brief autobiographies (a form of life writing) written by applicants to an elementary teacher certification program, in order to identify plotlines and teaching metaphors. They identified “12 [metaphoric] plotlines that accounted for these preservice teachers positioning as teachers: teacher as celebrity, teacher as creator, teacher as expert” and so on (p. 643). Reviewing the findings, the authors concluded, looking toward program revision, that “as teacher education is currently constructed, teacher educators may be unaware of how preservice teachers position themselves or of the obligations, duties and responsibilities they are ready to assume and those they may reject or avoid” (p. 647). These authors argued that teacher education needs to take “into account preservice teachers’ [beliefs about] themselves as teachers [otherwise] inservice teachers will continue to claim that their preservice teacher education was not very helpful” (p. 647).

In several studies pre- and inservice teachers were asked to generate their own metaphors. For example, in a study of the epistemological beliefs of 32 teachers enrolled in a master’s degree program, Patchen and Crawford (2011) asked teachers to develop a “historical timeline that depicted the teacher’s life influence and the decisions that led him or her to teaching” (p. 289) and then to write an educational autobiography. Based on the timelines and autobiographies, along with their daily experiences in the classroom, the teachers generated metaphors that described their

roles as teachers. They then told stories to elaborate the metaphors. The authors analyzed the data set to establish the relationship between teaching practice as the teachers reported it and their beliefs about epistemology. One conclusion proved especially troubling: “Examining the ways in which metaphors were substantiated provided a contextual grounding for interpretation and coding and revealed that a majority of teachers’ descriptions of practice were not consonant with their identified epistemological orientations” (p. 289). Attempting to explain this finding, the authors returned to the data. What they found was talk about a range of impediments to the teachers realizing their participatory beliefs, prompting the conclusion that the “dissonance between teachers’ metaphors and the descriptions of these metaphors reflects, at least conceptually, a defaulting to acquisition-based processes” (p. 296). When the results were reported to the teachers, most were surprised. In response they noted that their challenge was “to become more adept at ‘fusing’” constructivist pedagogy in which they reportedly strongly believed with the demands of accountability systems that support acquisition models of epistemology (p. 294).

When developing teacher reflectivity has been a program or personal and professional aim, teachers or student teachers have often been involved in some sort of data analysis. Seeking to better understand teachers’ beliefs about learning, Martinez, Sauleda, and Huber (2001), for example, had 50 experienced teachers enrolled in an evening course identify metaphors which were categorized into one of three groups or perspectives: behaviorist/empiricist (57%), cognitive (38%), or situative or socio-historic (5%). Once the metaphors were identified, the students were broken into 11 groups to share information about the three orientations. Within these groups the students explored the implications of their beliefs about teaching and learning; careful notes of discussions were analyzed by the authors. Comparisons of the findings were made with a group of intending teachers and conclusions drawn. Of particular concern to these authors was the rarity of the “situative” perspective. They had hoped that the practice of “collaborative reflection may help rectify the problem” (p. 975). Numerous studies, like this one, have been driven by researcher-preferred metaphors, often in favor of constructivist notions of teaching over behaviorist conceptions (Leavy, McSorly, & Bote, 2007). Concerned with improving their own practice, teacher educators have also engaged in the study of their own teaching metaphors (Bullough, 1994; Miller, East, Fitzgerald, Heston, & Veenstra, 2001).

Questioning of identity. While many metaphor studies have been conducted seeking to identify teachers’ beliefs, particularly about various aspects of teaching and of learning and related to their working assumptions about content, several studies have focused on the related but more general problem of identity (the formation of the teaching self) over time. This concern recognizes that many (perhaps most) teachers consider teaching not simply a role play but a form of life—an embodied expression of who the teacher is or is striving to be as a human being (Sugrue, 1997). As a more or less coherent system of beliefs grounded in biography, bounded by habit and patterned in emotion, identity is a crucially important arena within which the struggle to find and form a life-affirming place within schools is played out. Since all institutions represent and support a limited range of subject positions complete with preferred metaphors, the challenge for all teachers, but most especially for beginning teachers, is to negotiate as quickly as possible a life-affirming set of roles and relationships, which includes choosing how they will be with and

for their students. Virtually all metaphor studies of teaching speak to this concern in some fashion. A few attend to it directly and over time, seeking to understand the processes involved in becoming a teacher and to assist beginning teachers to more successfully choose themselves (Bullough & Baughman, 1997; Bullough, Knowles, & Crow, 1991; Sumison, 2003).

Like “possible selves” research (Hamman, Gosselin, Romano, & Bunuan, 2010) and research into “I positions” (Akkerman & Meijer, 2011, p. 312), metaphors may be used, not merely to capture current but hidden beliefs, but to form desired images of self toward which to aspire. In fact, the process of data gathering itself may and probably does change informants as they reflect on their own thinking. This aspect of metaphors is nicely illustrated by a study of a secondary English teacher who conceived of himself as a “husbandman.” Throughout student teaching and into his first year of teaching, this metaphor called him back to his central beliefs when losing his way, sharpened his focus on problems of role enactment, and served as a basis for both self and institutional criticism (Bullough, 1992). In another case study, Bullough and Knowles (1991) described the struggles of a second career teacher as he tried and failed to achieve himself as an inquiry teacher within a science department and school deeply embedded in metaphors associated with maintaining student control. Lacking skills of enactment, this teacher eventually embraced a metaphor of “teacher is policeman,” and was miserable doing so. His was a bad role play.

Strengths and Weakness of Metaphor Analysis

The strengths and weaknesses of metaphor analysis in the study of teachers’ beliefs are directly related to the ways in which metaphor operates in human language and experience. Metaphors simplify experience and enable comparison. Metaphors have a generative quality (Jensen, 2006) that tends to open up fresh perspectives on experience, new ways for making meaning. Metaphors are ubiquitous, and usually generated easily, although not always. Metaphors operate at various levels and are accessible, although not without difficulty. At the deeper “root” levels, the more generative and less surface metaphors capture foundational beliefs—“folk theories.” Whether generated by self or researcher, metaphors offer points of criticism of culture and context according to which metaphors dominate discourse as well as which are neglected or missing. Metaphors and changes in metaphors have also proven themselves useful for exploring changes in beliefs over time (Sumison, 2003; Bullough & Baughman, 1997). Finally, by calling forth ideals, metaphor analysis may reveal unexpected meanings and encourage future-oriented and consistent action (Bullough, 1992).

Various weaknesses with metaphor analysis also have been identified. Some problems relate most specifically to studies reporting metaphors generated by teachers. Some teachers have difficulty locating metaphors or may generate superficial ones (Bullough with Stokes, 1994). As with life writing and journaling, distrust of those who will read and respond to the metaphors may be an issue. A virtue of metaphors, their ability to simplify complexity and enable discussion, may lead to problems for researchers. No single metaphor can or will capture the whole of a teacher’s belief system (Sfard, 1998), although root metaphors may get close. Dissonance is common (Patchen & Crawford, 2011), as are oversimplification and distortion, including the

imposition of meaning by researchers onto teachers. Honoring the richness of metaphorical language but forgetting its flexibility, researchers may assume meanings are shared when they are not. In anticipation of this problem, Alger (2009) developed a “textual description” for each metaphor included in her survey (p. 744).

CONCLUSION

In this chapter I have described three families of research methods used to study teachers’ beliefs noting origins, research practices, strengths, and weaknesses. As researchers’ understanding of the complexity of teachers’ beliefs has grown, concern with simply revealing, identifying, and classifying beliefs, including metaphors, has given way to other, more challenging, questions. Among these, perhaps the three most important involve (a) the biographical and historical origins of beliefs, (b) development, evolution, and change in beliefs over time and in context, and (c) connections between teachers’ beliefs and classroom practice. To address such tightly intertwined matters necessitates use of diverse methods of data gathering and forms of analysis, as suggested by the many studies reviewed in this chapter. Also, when addressing questions like these, it is incumbent upon researchers to continue to study teacher education as an arena for developing and changing beliefs and to engage students as partners in inquiry (Stuart & Thurlow, 2000). A few programs have done this, but not many (Bullough & Gitlin, 2001). Rather than researchers taking full responsibility for identifying beliefs and locating tensions between beliefs and practices (Phipps & Borg, 2008), teachers and teacher education students must help locate them and become actively involved in the quest for new and more powerful forms of teacher education and teacher learning. As suggested, given the nature of teacher education inquiry, pedagogical and research interests necessarily intertwine with the result that the very process of generating data—whether writing life histories or blogging—will likely lead to fresh insights into what is felt and believed. Opening such moments to consideration, including where ambitions clash and aspirations fail, would appear to be an important research aim.

With each of the methods described, ethical issues loom large, especially since much of the research literature on teachers’ beliefs suggests both beginning and experienced teachers are in need of fixing. When student writing becomes research data and students or teachers generating data are required to reveal very personal information, particularly when grading of products is involved, researchers may find themselves in an ethical quagmire. Before embracing and employing any of the methods described in this chapter, researchers must carefully consider and address these issues. Where trust is compromised, results are suspect.

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Section III

Teachers' Identity, Motivation, and Affect

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10

THE INTERSECTION OF IDENTITY, BELIEFS, AND POLITICS IN CONCEPTUALIZING “TEACHER IDENTITY”

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What is *identity* and how is it distinct from or informed by *beliefs*? One of the main challenges in responding to this question is that scholars continuously try to codify and theorize constructs that are complex, well beyond our capacity to capture and understand all of their nuances. Additional questions arise as soon as one *chooses* a particular definition of one and/or the other construct. Is identity stable, or is it malleable and constantly influenced by context and competing narratives? Are beliefs different from emotions and/or cognitive propositions? Are identities and beliefs related, and, if yes, how? In the last few decades, volumes have been written, spanning multiple disciplines, exploring these questions.

Despite these numerous studies, we have yet to be able to specify how identity and beliefs, marked by emotions and values and processed through reflection, implicate and intertwine with political realities found in larger societal and historical power relations in ways that are inseparable but not conflatable. Granted, whichever position scholars adopt in analyzing identity and its intersection with beliefs, context, history, and power will be supported by rigorous evidence; at the same time, differing positions will emerge, supported by equally rigorous evidence. More importantly, even with all the most rigorous evidence compiled and analyzed by the best minds, our understanding will fall far short of capturing the breathtaking, “dizzying” (Bruner, 1995) complexity of the entity we call identity: its ambiguous nature, its formation and reformation, and its enmeshment in multiple domains.

This chapter attempts to explore the intersection of teacher identity, teachers’ beliefs, and politics, humbly undertaken with full understanding that our efforts will inherently muddy the waters, yet with the hope that these efforts will provide moments of clarity and points of entry to support educators—teachers, administrators, and teacher educators—in forming and working from/with the construct of “teacher identity.” Living with that tension is part of how insight advances. We

will begin by first defining the three key terms—identity, beliefs, and politics—that constitute the focus of this chapter and describe their intersection. Next, we provide a brief overview of specific characteristics of teacher identity as seen in a selection of current literature. We then review the aspects of identity formation as intertwined with beliefs. And finally, we discuss the implications of this overview for teacher education, teacher professional development and future research.

DEFINITIONS OF TEACHER IDENTITY, TEACHERS' BELIEFS, AND POLITICS

Teacher identity has been recently defined within an explicitly political frame of reference (e.g., Clarke, 2009; Mockler, 2011; Zembylas & Bekerman, 2008). In this model, teacher identity is at once a complex matter of the sociopolitical and the individual, of discourse and practice, of agency and structure, and of the singular and the multiple (Mockler, 2011). *Teacher identity* in this chapter, then, is understood as a dynamic, career-long process of negotiating the teacher-self in relation to personal and emotional experiences, the professional and social context, and the micro and macro political environment. *Teachers' beliefs* are understood as the interconnected, affective, conceptual, and evaluative perspectives that teachers develop about themselves, their students, student learning, methods of instruction, curriculum, and schools as social institutions (Kagan, 1992; Pajares, 1992). *Politics* are understood as the micro and macro interactions in which power relations are constantly negotiated and impact on the work of teachers (e.g., school climate, neo-liberal agendas, etc.). The point, then, is that any definition of teacher identity and teachers' beliefs requires recognition that both are formed, interact, and are negotiated not only in an individual or social process but also in a deeply political process.

Thinking about the intersection of teacher identity and teachers' beliefs and how these can be inherently political becomes clearer when we consider multiple units of analysis. One unit of analysis is the macro, holistic construct of "identity" in general. Using the metaphor of narrative, for example, Bruner describes a theory of personality where the self is "both outer and inner, public and private, innate and acquired, the product of evolution and the offspring of culturally shaped narrative" (Bruner, 1998, p. 326). The macro level unit of analysis, i.e., "identity" can then be seen as unitary or the product of an effort to maintain self-congruence, but it will inherently require examination at more nuanced, micro-levels, units of analysis that Bruner calls "indicators." These indicators include (not exhaustively) elements such as agency, commitment, resource, social reference, evaluation, qualia, reflexivity, and positionality (Bruner, 1995, pp. 310–311). Some of these micro-level units of analysis are interior and psychologically oriented; others are socio-cultural-political in nature. Some may fall into the realm of "nature," while others are clearly external and formative. All weave together as individuals negotiate new and old experiences in an on-going effort to maintain a congruent identity. Each negotiation can implicate elements of power (social, cultural, economic, etc.) in the narrative formation, with each then becoming a site where political elements can enter the process. Though each indicator can be examined individually, all are mutually engaged in the formation and sustenance of identity; none is atomistic. This narrative process of meaning making, across multiple domains and elements, to sustain a unitary identity,

that is, interpreting and negotiating apparently contradictory experiences, similarly described by others (see Crossley, 2000; Ricoeur, 1984, 1988; Taylor, 1992), shows the inherently political nature of the formation of identity.

The domain of teachers' beliefs can similarly be better understood through the use of both macro- and micro-level units of analysis. The macro unit of analysis derives from the systemic nature of beliefs. Individual beliefs are clustered into interconnected, holistic belief systems (Pajares, 1996), also marked by efforts to maintain congruence, creating what Strike and Posner (1992) called a "belief ecology." Earlier beliefs serve as filters for incoming conceptions, determining how to validly interrogate beliefs, what constitutes evidence, and, eventually, which new beliefs enter the system (see Fives & Buehl, 2012). Prior beliefs also function as interpreters of incoming conceptions, framing comprehension of new experiences and determining how new beliefs relate to the existing belief ecology. Once "admitted" into the belief ecology, the new beliefs exist in a mutually dependent relationship with earlier beliefs, intact but also always joining and being shaped by and reshaping prior beliefs. The metaphor of a belief ecology helps clarify what may appear to be contradictory subsets of belief. Specific beliefs a teacher holds about his or her practice may appear contradictory until they are examined in the context of the larger belief systems under which they are subsumed and with which they are congruent (Pajares, 1996).

While the ecology of beliefs presents a macro-level unit of analysis, in the same way that narrative identity formation requires attention to the micro-level of identity indicators, understanding of beliefs requires analysis of micro-level components of beliefs. Abelson (1979), in distinguishing between beliefs and knowledge, described how beliefs comprise a combination of evaluative and affective components. Similarly, Nespor (1987) suggested that understanding the role of emotion is key to studying beliefs and belief change. While knowledge depends on epistemic warrant and evidence of truth, belief does not (Richardson, 1996). Consequently, beliefs derived from value-based determinations of "good" and "bad," and the corresponding emotional content those evaluative determinations produce, are stronger and more tenaciously rooted than knowledge derived simply from "facts" (see Gill & Hardin, Chapter 13, this volume, for more on this issue). The power of values and emotion may partially explain why belief systems are resistant to change even when people are confronted with logical contradictory evidence (Clark, 1988; Strike & Posner, 1992). Similarly, beliefs grow from and are sustained by anecdote and experience, propaganda and folklore (Abelson, 1979), adding another layer to their stubborn resistance to change. Hence, the micro-level unit of analysis is critical to understanding how beliefs operate to shape both identity and practice while it simultaneously reveals sites of identity formation that inherently implicate political negotiations of power.

While beliefs are not always explicitly singled out as components in the narrative process of forming and sustaining one's identity, their implication is intuitive (Bruner, 1995, 1998). In both the narrative negotiation of identity and the sorting and subsuming of beliefs, the reflective process involved is frequently tacit, unexamined, and even unconscious (Nespor, 1987; Richardson, 1996), with the implication that bringing such negotiations to explicit, conscious level is valuable for identity formation and/or belief change. However, the complex interplay of micro-level elements of both identity and belief would suggest that simply priming cognitive

awareness will be insufficient, given researchers' descriptions of identity as derived from multiple, composite, and at times contradictory experiences (Bruner, 1996) and of beliefs as more affective and evaluative than knowledge (Nespor, 1987) and based as much on anecdote/experience (Abelson, 1979) as evidence of truth (Richardson, 1996). At this point, the political nature of both identity and beliefs, and consequently of their mutually informing relationship, becomes even more apparent. If the elements that comprise identity, including those that comprise beliefs occurring in a nested, symbiotic relationship, can be emotionally and evaluatively driven, grounded in experience/history, and reiterated through cultural narratives and media-informed, nationalistic rituals, and if those elements and one's reflection on them/negotiation of them can occur below cognition, the opportunity for power relations to shape identity, with its accompanying actions, expands widely, if not overtly.

An example of this intersection of identity, beliefs, and politics is seen in Valenzuela's (1999) description of Anglo teachers in a predominantly Hispanic school who clearly identify themselves as teachers who care about the education of their students. This caring identity, however, is housed in unexamined beliefs about what constitutes caring in education. The teachers practice "aesthetic care" *about* the logistics of school—attendance, prescribed dress and compliant attitude in students, instruction and assessment, achievement, etc.—in spite of their students' understanding of caring as "authentic care" *for* students, manifested in relationships, honoring of students' culture, and so on. When these teachers are confronted with rebellious or indifferent students, students who are resistant specifically because they believe that their teachers and the very school structures themselves do not care for them, their culture/language, or their education, the teachers frequently interpret this student reality in ways that protect their belief ecologies regarding education and their congruent identities as caring teachers. Since they embrace an identity and belief structure as caring teachers, the uncooperative students must not care. Rather than reflect on and critique their own beliefs and identities, teachers condemn the students as not caring about their own education, thus keeping their own identities, including their beliefs, congruent and intact. Even more, the teachers' unexamined beliefs hinder their ability to enact "critical care," that is, contextualizing students and their learning experiences in socio-cultural-political contexts, both historical and current, where inappropriate exercise of power has frequently marginalized them. The lack of historicizing of this situation, coupled with the power differential held by the teachers/administrators over the students and their families, reveal the way identity (with beliefs nested in the narrative negotiation of said identity) significantly implicates power and the inherent political nature of identity formation and expression in praxis.

All in all, the nested and interlocking elements of both beliefs and identity, prompting negotiation among events and counter-narratives to sustain an overarching self-congruence, requires researchers, educators, and teacher educators to recognize the power of emotions, of evaluative belief systems, and of tacit, nearly invisible relations of power in the formation of teachers' identity. This intersection reflects the dynamism, the multiplicity, the relational/contextual, and the emotional characteristics of identity; this intersection also matches the dialogic/discursive, agency/structure, and reflective elements of the formation process. Support for teachers and

preservice teachers to reflectively negotiate the tension encountered along these lines of intersection is surely warranted, if teachers' identity, coupled with beliefs, is to produce an effective profession.

EXPLORING CHARACTERISTICS OF TEACHER IDENTITY

Recent conceptualizations of teacher identity seem to reflect the perspective that identity is generally dynamic, relational, multiple, and changing over time under the influence of a range of individual and contextual factors, and that teachers' identity is an important influence on teaching and learning (Beauchamp & Thomas, 2009; Beijaard, Meijer, & Verloop, 2004; Day et al., 2006; Rodgers & Scott, 2008). In their review, Beijaard et al. (2004) highlight four common characteristics of professional identity stemming from the works reviewed. First, identity is not a fixed entity, but rather the product of an ongoing process of interpretation and re-interpretation of experiences. Second, the interaction of this ongoing process involves both a person and a context and thus teacher identity is conceptualized in relation to communities of practice. Third, the formation of teacher identity involves agency, that is, it requires the active pursuit of professional development and learning in accordance with a teacher's goals. And finally, sub-identities exist within a professional teacher identity, especially in the initial steps of a teacher's career, which contribute to a somewhat harmonious whole. Beijaard et al. (2004) also emphasize that, although different understandings of teacher identity exist, often with an unclear distinction between self and identity or between personal and professional identity, scholars agree overall that identity has a multi-faceted, dynamic, and relational nature.

Day et al. (2006) reiterate this multiple, dynamic and relational frame of identity by emphasizing that teacher identities are neither intrinsically stable nor intrinsically fragmented; rather, teacher identities are more or less stable and more or less fragmented at different times and in different ways according to a number of life, career, and situational factors. In other words, interrelationships unavoidably exist between the professional and personal identities of teachers. For example, preservice teachers develop a preteaching identity on the basis of their student images of teachers, their initial beliefs and concepts of what constitutes a good teacher, and their implicit theories of teaching (Flores & Day, 2006). In general, teacher identity is considered to involve the complex interplay between personal experience and cultural, social, institutional, and environmental contexts (Sfard & Prusak, 2005). This understanding of teacher identity reflects sociocultural perspectives and views identity as both product (as a result of the sociocultural influences on a teacher) and process (an ongoing interaction within teacher development; see Olsen, 2008).

In addition to this relational and sociocultural frame of teacher identity, more developmental accounts have also been used in studying teachers' professional identity. For example, Rodgers and Scott's (2008) review highlights teacher identity formation through a lens that emphasizes the developmental stages in which teachers make sense out of their experiences. Rodgers and Scott's psychological frame does not deny that identity is relational; in fact, these authors reiterate some of the characteristics identified by Beijaard et al. (2004). However, Rodgers and Scott's emphasis is more on the importance of considering the developmental aspects of teachers'

professional identity and the various stages through which teacher identity grows over time (see also, Bullough & Gitlin, 1995, 2001).

In the most recent review of literature on teacher identity, Beauchamp and Thomas (2009) reiterate that defining teacher identity is challenging, yet several characterizations of teacher identity recur, most commonly in relation to the multiplicity, discontinuity, and social nature of identity. Two approaches that reflect these characterizations of teacher identity are the discursive and the dialogical approaches (e.g., Akkerman & Meijer, 2011; Haniford, 2010; Trent, 2011). The notion of teacher identity-in-discourse acknowledges that identities are discursively constituted, mainly through language. Grounded in poststructuralist theory, this conceptualization views language (or discourse) and identity as mutually constitutive; identity construction, then, is a process of struggle because the individual struggles to make sense of his or her subjectivity by participating (or being prevented from participating) in various discourses. Similarly, Akkerman and Meijer (2011) conceptualize teacher identity according to a dialogical approach grounded in the emerging theory of the dialogical self in psychology. Within this frame, teacher identity is conceived as both unitary and multiple, both continuous and discontinuous, and both individual and social. Akkerman and Meijer emphasize that, although many studies in teaching and teacher education describe teacher identity as a narrative and dynamic construction, researchers neither explicitly present nor discuss a dialogical approach. On the basis of this dialogical approach, Akkerman and Meijer suggest defining teacher identity as “*an ongoing process of negotiating multiple I-positions in such a way that a more or less coherent and consistent sense of self is maintained throughout various participations and self-investments in one’s (working) life*” (p. 315, emphasis in original).

Embedded in these multiple characteristics of identity are several major aspects involved in the formation of teacher identity intertwined with beliefs: emotion aspects; narrative and discourse aspects; reflection aspects; and agency/structure aspects. Beliefs intertwine these aspects, although they are not always singled out explicitly in the studies undertaken (see also Bruner, 1995, 1998). The following part of the chapter discusses each one of these aspects, including the role of beliefs, in the formation of teacher identity.

THE ASPECTS OF IDENTITY FORMATION AS INTERTWINED WITH BELIEFS

Emotion Aspects

Emotion has been taken up increasingly as an important aspect in the discussion of teacher identity (Beauchamp & Thomas, 2009; Rodgers & Scott, 2008). Since the work by such scholars as Hargreaves (1998, 2000, 2001) and Nias (1996) who recognized emotion as an influential factor in teachers’ professional lives and self-understanding, interest in emotion and teacher identity as a research focus has grown (e.g., Cross & Hong, 2009, 2012; Darby, 2008; Hong, 2010; Lasky, 2005; O’Connor, 2008; Schutz, Cross, Hong, & Osbon, 2007; Shapiro, 2010; van Veen, Slegers, & van de Ven, 2005; Zembylas, 2003a, 2005). Collectively, this research in recent years emphasizes three key themes: first, the emotions experienced by teachers during the

ongoing construction of their professional identities are deeply connected to their biographies, their beliefs, and the sociopolitical context of their workplace; second, emotion is recognized as an influential factor in teachers' personal and professional identities, especially in the context of school reform efforts; and, third, emotions, beliefs, and teacher identity are conceptually defined as interrelated and dynamic, regardless of the theoretical framework utilized by researchers.

A special issue of *Teaching and Teacher Education* (2005) devoted to “emotions, teacher identity, and change” provided a systematic study of the link between emotion and teacher identity from different theoretical perspectives; although teachers' beliefs were not the focus of this special issue, the intertwining between emotions and beliefs was evident throughout the studies reported. In particular, five empirical studies and two discussion papers examined the connections between teacher emotions and teacher professional identities, especially during times of reform. Lasky (2005) employed a sociocultural theoretical lens to examine how the dynamic interplay among teacher identity, agency, and context influenced secondary teachers' sense of identity. Lasky showed how teacher agency was constrained in the context of a reform effort by teachers' emotional struggle to deal with the politics of increased managerialism and accountability pressures. van Veen et al. (2005) adopted a social psychological approach to show how teacher emotions provided indications of a teacher's identity and his perceptions of the professional environment in which he worked. Zembylas (2005; see also 2003a, 2007), utilizing a post-structuralist approach to emotions and teacher identity, showed how a teacher's identity was influenced by the emotional rules of the classroom and the school; his study provided evidence of the power relations involved in the process of teacher identity formation and the role of the teacher's emotions and perceptions in this process. Schmidt and Datnow (2005) incorporated sociological theory to investigate how teachers made sense of different kinds of reforms, the emotions involved in the process, and the impact on how teachers viewed their role and identity as a teacher. Finally, Hargreaves (2005) used a social-constructionist approach to explore how age and career stages affected teachers' emotional responses to reforms in their schools; Hargreaves identified important differences between the emotional experiences of beginning and veteran teachers. In their discussion papers, Reio (2005) focused on how teachers' emotional experiences and perceptions of school reform influenced their risk taking and their identity formation, while Kelchtermans (2005) recommended the term *self-understanding*—teachers' dynamic sense of identity—to encompass self-image, job motivation, self-beliefs, self-esteem, and task perception by teachers. All of the contributors in this special issue argued that biographical factors were entangled with the professional context and the structural, political, and cultural working conditions to construct teacher identity and beliefs.

In their research program over the years, Schutz et al. (2007) and his colleagues Cross and Hong (2009, 2012) and Hong (2010) adopted a social psychological approach to explore the transactions among teacher identities, teachers' beliefs, and emotions in the classroom. These researchers analyzed the influence of teachers' domain-specific beliefs and professional identity on their emotional experiences as teachers attempted to incorporate reform-oriented practices. This research showed how teachers' internal psychological characteristics transacted with external social-historical context to produce emotions and shape teachers' sense of professional

identity. Importantly, the findings of this research also showed that preservice and beginning teachers' professional identity was related to emotional burnout and dropping out of the profession.

Other researchers in the last few years also illustrated how teachers' emotions were involved in the (re)construction of teachers' professional identity and self-understanding. Darby (2008) described the fear and intimidation that teachers experienced when their professional self-understandings were challenged in the context of a school reform effort. While these teachers at first found the process threatening, when space for honest exchange of emotions and perceptions or ideas was created, they gradually felt that the reform efforts offered opportunities for new growth and learning (see also Zembylas, 2010). This exchange led to a re-structuring of professional identity and self-understanding for these teachers. Similarly, O'Connor's (2008) study showed that teachers' emotional experiences were linked to teachers' professional identities. In particular, O'Connor argued that the caring behavior that teachers exhibited in their work (e.g., through how they used and managed emotions to care for and about students) seemed to have professional, performative, and philosophical dimensions; that is, the teachers used their identities to guide and shape their emotional and professional decisions. Finally, Shapiro (2010), revisiting previously published research along with her personal reflections, discussed the relationship between emotions, beliefs, and teacher identity. Shapiro argued that a research focus on emotional identity is important because it could offer alternatives to the persistent dehumanization and increased instrumentalism of the teaching profession in our current sociopolitical context.

Narrative and Discourse Aspects

The literature on discursive/narrative construction of teacher identity derives from the sociocultural orientation (Beauchamp & Thomas, 2009), emphasizing the multiplicity, discontinuity, and social nature of identity, with several themes emerging and interweaving in the research. First, linguistic social exchange and identity are mutually constitutive; the linguistic expression of beliefs then closely aligns with teacher identity formation. Second, while narrative is often viewed from a psychological framework—i.e., we make sense of our lives through narration—in several studies, narrative is a manifestation of socio-culturally founded discourse, both in the teacher and in the institutions/national contexts in which they are located. Third, discursive identity formation is dialogically relational, highlighting the importance of noting how dialogue is influenced by self-beliefs and other beliefs. Teachers position their identity in relation to students, other teachers, teacher educators, and discourses circulating in curricula, schools, and national images.

Grion and Varisco (2007) explored developmental identity formation in preservice teachers, novices, and expert teachers through collaborative, on-line discourse where participants articulated their positions (i.e., beliefs about themselves as teachers) relative to classroom case studies. Both preservice teachers and novices expressed identities marked by theory-based responses and an emerging sense of community while experts maintained “strategic individualism” (p. 280), with rigid preference for practical over theoretical knowledge. Similarly, Thomas and Beauchamp (2011) studied how beginning teachers' use of metaphors reflected their circumstantially

evolving self-perceptions in relation to students and declining personal confidence. The authors suggested metaphors provide insight into novice's identities, as well as implicit expressions of self-beliefs (Lakoff & Johnson, 1980).

The next two studies show the role of context, with implication regarding the role of beliefs and socio-political power. Haniford's (2010) study examined how a preservice teacher's beliefs and identity as a white preservice teacher in a predominantly African American urban context emerged in her teaching plans and reflections. In opposition to her preparation program's discourse on the pedagogical value of building lessons based on students' interests, the preservice teacher controlled the curriculum exclusively, dismissing students' interests as "worthless," displaying an identity grounded in the belief that teacher-structured lessons designed to support student mastery would ultimately be more engaging and effective than lessons built on student interest. Smit, Fritz, and Mabalane (2010) similarly analyzed the role of context in teachers' identity construction, examining the metaphors used by teachers in post-apartheid South Africa. Teachers in ill-equipped schools marked by poverty, expressed identities characterized as isolated and overwhelmed, while teachers in wealthier schools expressed none of the negative identity markers. Smit et al. (2010) claimed that the "power relations [that] are inscribed into the material processes" (p. 103) create the margins where identity is forged.

And finally, Cohen (2008), using a sociological/discourse analysis framework, showed how practicing teachers discursively collaborated in toxic contexts of isolation and delegitimizing media that lionized isolated heroes. Together, they negotiated their professional identities by creating counter-narratives of themselves as collective knowledge producers and agents of change, thus combating the negative media images. Similarly, Trent and Lim (2010) used a post-structuralist lens to study how teachers, participating in school university partnerships, responded to the dialogical messages communicated from the universities. In one partnership, where teachers were valued as equals, positive identities emerged, marked by new competencies, increased agency, and ownership of the partnership. In the other, where test results were valued over teachers, teachers expressed identities of marginalization and decreased agency and competence.

Reflection Aspects

The literature on the reflection process in teacher identity formation derives from a variety of theoretical orientations with four themes emerging: first, identity development takes place through reflection on multiple images/beliefs about past experiences and future possibilities; second, reflection on identity is sparked by and enriched at sites of conflict and discomfort; third, the context of reflection is very important, including discursive reflection around actual practice rather than theory, occurring in communities of practice; and fourth, multiple factors, ranging from observable behaviors to more intangible beliefs and values, are reciprocally implicated in how the reflection process functions in identity formation. Though each study maintains a specific focus, threads of these themes are woven throughout.

The role of reflection to support and understand identity formation is the psychological focus of Smith's (2007) study in which she examined how content and

pedagogical knowledge growth as well as membership in multiple communities affected identity development of beginning primary science teachers. Increased specific pedagogical content knowledge competed with generalized pedagogical knowledge and did not automatically translate into strong identities and beliefs of self as teacher. The more the teachers' membership in multiple communities aligned with the identity of science teacher, the stronger the identity formation was, suggesting the power of ongoing identity formation through "drawing on the past and imagining futures" (Smith, 2007, p. 393). Beauchamp and Thomas (2011) adopted a similar psychological framework to examine how anticipatory reflection on one's ideal self can shape the development of identity in beginning teachers. Participants responded tentatively to this prompt of "ideal self" with some clear visions of the ideal accompanied by insecurity over their ability to reach that ideal and little indication that teachers saw the value of reflection in reaching the ideal teacher identity. According to Beauchamp and Thomas, this point of insecurity presents a site ripe for growth provided the beginning teachers receive sufficient support.

Urzúa and Vásquez (2008) also examined a future-oriented, anticipatory pre-service teacher reflection, using a sociocultural framework. In both mentoring and post-observation contexts, student teachers demonstrated anticipatory reflective thinking focused *on* action, i.e., problem posing and solution identification, including feelings of uncertainty regarding their ability to resolve identified problems, with the possibility of interpreting their experiences in ways that can project greater meta-cognitive awareness of their possible future identities (i.e., reflection on possibilities *in* action). The need for stronger mentoring in the reflection process to support confidence and agency was highlighted. Warin, Maddock, Pell, and Hargreaves (2006), using a similar sociocultural discursive analysis and poststructuralist orientation of multiple identities, examined the ways the emotional discomfort of identity dissonance, in this case between one's self-image/self-belief and how one is seen by others, can produce spaces for identity growth, particularly when the reflection is on "self-in-action." Sutherland, Howard, and Markauskaite's (2010) study of reflection in on-line settings also raised the question of how identity forms in discomforting settings and the importance of mentorship. They assessed beginning teachers' "voice," that is, their ability to reflectively (re)interpret their teacher preparation experiences. While most increased their "voice," few showed a strong sense of belief in themselves as teachers. Sutherland et al. (2010) posit the challenge inherent in on-line work, the need for stronger mentoring, inhibitions about sharing personal interpretations, and the interference of prior attitudes and beliefs.

Reflection as captured in these selected studies indicates the complexity of researching the process of identity formation. While focusing on reflection, scholars narrowed to specific constructs, yet in each study, multiple factors emerged, such as the role of prior personal (in conjunction with professional) identity, the significance of community membership, the importance of mentoring support, and the value of reflection on actual practice versus anticipated practice. The range of factors spring from deeper, less visible regions, however. In an effort to organize a more coherent framework for understanding the holistic formation of a "good teacher" identity and to understand how teacher educators can support that formation, Korthagen (2004) provided an "onion" model of the levels of change implicated in the formation of teacher identity. Starting from the outer ring of the "onion" and

proceeding inwards, Korthagen presents a multiplicity of complex levels, from tangible and observable to progressively more intangible and abstract—environment / behavior / competencies / beliefs / identity / mission. Each can reciprocally influence the other. For example, a teacher’s beliefs about “good teaching” shape the behaviors she implements in the classroom. We know intuitively, however, that reflection on efficacy of those implemented behaviors can very well change the teacher’s beliefs of what constitutes “good teaching.” These levels of reciprocity extend through all the rings of the “onion.” Elements of one’s personal / professional identity and mission / calling as a teacher are implicated in what one then believes about teaching practice, even as one’s beliefs about teaching and learning, students and contexts, can influence one’s sense of identity and mission. According to Korthagen, then, teacher educators’ support of preservice teachers in their formation as “good teachers” requires tailoring reflection to specific levels in the “onion” of teacher identity formation. While the outer, observable (and measurable) levels of environment, behaviors, and competencies currently garner much attention from teacher educators and researchers, reflection on the deeper core of personal / professional identity and mission / sense of calling, drawing on the qualities that reside at these points (such as empathy, compassion, understanding, tolerance, love, flexibility), need equal attention for the preservice teacher benefit from the interaction among all the levels of change and formation.

Agency/Structure Aspects

The agency/structural aspects of identity development appear less well-delineated than the other aspects. The term *agency* has been defined as the capacity to achieve one’s goals, implying that a self with cognitive and emotional qualities, perhaps inherent in an individual, are the source of such capacity (Beauchamp & Thomas, 2011; Day, Kingston, Stobart, & Sammons, 2006). *Structure* means those external influences, both context and process, that shape identity development as a teacher (Schepens, Aelterman, & Vlerick, 2009). In laymen’s terms, the tension is seen in the debate over “being born a teacher”—an expression of *agency*—versus “becoming a teacher”—through structural influences such as teacher education programs or inservice professional development. This distinction between teacher identity that is derived from personal agency and identity that is derived from structures that support becoming a teacher is important since it implicates the nature of who may become an effective teacher and even the nature of the teaching process itself (Hoveid & Hoveid, 2008).

Since both the personal and professional are implicated in identity, the question of static or malleable applies to both. As seen in the literature, professional identity is situated and malleable, forming and shifting in response to the expectations of structures (Ball, 1972, as cited in Day et al., 2006). Aspects of personal identity, such as personality traits, are often seen as inherent and static (John, Donahue, & Kentle, 1991); others, such as beliefs and values, are seen as dynamic (Beijaard et al., 2004). Both personal and professional identities appear to operate in a dynamic tension, influenced by both agency and structure, as teachers respond to and are shaped by the interaction of classroom and institutional structures and the personal investment derived from agency that such work demands (Day et al., 2006).

In the USA, for example, this debate around agency/structure is partially seen in the question of teacher dispositions. Will an effective teacher possess specific personal qualities (Burant, Chubbuck, & Whipp, 2007)? Accrediting agencies in the United States maintain that teaching requires ethical dispositions such as fairness, honesty, and responsibility (Wise, 2005). Similarly, Freire (1998) described qualities of progressive teachers including humility, lovingness, courage, and a joy of living. Indeed, many scholars identify moral and ethical personal traits as significant to efficacious teaching (Burant et al., 2007; Dewey, 1933/1964; Gudmundsdóttir, 1990; Haberman, 1996; Hansen, 2001; Sockett, 2006.) Whether these are inherent qualities one has from birth or they can be learned is not entirely clear. A psychological framework posits that some personality traits may be inherent. Do they, however, influence one's efficacy as a teacher? That question remains.

Schepens, Aelterman, and Vlerick (2009) conducted a quantitative study of the relationship among beginning teachers' personality traits as measured by "The Big Five" personality trait assessment, the type of elements of preparation, and their self-reported professional identity as a successful teacher, indicated by level of commitment, sense of efficacy, and professional orientation. Findings showed that "Big Five" personality traits of agreeableness, intelligence, and extraversion were the strongest predictors of professional identity formation among teachers. Hoveid and Hoveid (2008) offer a well-reasoned philosophical discussion of the interaction of agency/structure, claiming that to achieve the classical ideals/beliefs of education valued in Norway (in opposition to the neo-liberal and instrumental conceptions of educational success as measurable outcomes), the teacher will position herself as open to learning, thus exercising the agency of her self/personal identity in relation to the institution in which she teaches. They claim that this learning of a teacher identity illustrates how the teacher's self intersects with both knowledge and teaching/learning in the structure of the teaching environment. "This contrasts with a conception of teaching as a . . . talent that only a few are granted or . . . as a way of performing instructions regulated by a set of defined and measurable universal targets" (Hoveid & Hoveid, 2008, p. 136).

Day et al. (2006) cited similar findings in the qualitative work of Nias (1989, cited in Day et al., 2006), who established the initial presence of the personal over the professional in early career teachers, with an integration of personal and professional (where teachers identify themselves as teachers) only coming later in their work lives in response to the relationships established with their students. This trajectory illustrated how "personal, professional, emotional and organizational components of identity . . . connect to individual agency and its interplay with structure" (Day et al., 2006, p. 605).

An interactive continuum may be a helpful way to conceive of agency and structure in the formation of a teacher identity. Individuals are born with personality traits and talents which may support successful teaching in a given context. They are then apprenticed through society and their own schooling experience to sets of beliefs and dispositions that may or may not be supportive of good teaching. The two realities are present in preservice teachers who enter the structures of preparation programs, where varying degrees of adjustment change and/or enhancement can occur. Teachers then enter the profession where the support and pressures of colleagues, context, students, and political environments, interact with personal

identity characteristics to constitute professional identity. The role of both agency and structure is present in the entire process. In sum, “identities are a shifting amalgam of personal biography, culture, social influence, and institutional values which may change according to role or circumstance” (Day et al., 2006, p. 613).

In each of these aspects—emotion, narrative/discourse, reflection, and agency/structure—boundaries quickly blur. For example, emotions are often intertwined with beliefs (see Fridja, Mansted, & Bem, 2000); similarly, the dynamic, multiple nature of identity and its contextualized, relational component is clear. Throughout, these studies demonstrate that reflection on teaching and the formation of teacher identity, often framed as an individual activity, is influenced by both personal beliefs, collaborative interactions, and contextual aspects resulting in multiple, shifting identities formed in relation to multiple discourses. By contextualizing teacher identity formation in relation to larger discourses, the reality of power relations is highlighted, making the political nature of identity ever more apparent.

IMPLICATIONS FOR TEACHER EDUCATION, TEACHER PROFESSIONAL DEVELOPMENT, AND FUTURE RESEARCH

Taking a stance that highlights the intersection of teacher identity, beliefs, and politics has important implications for teacher education, teacher professional development and future research. In the first place, our review emphasizes that teacher identity needs to be conceptualized as a *formation* (see also Mockler, 2011). The important process of developing an identity as teacher, intersecting with beliefs, emotions, and values, is ongoing and spreads throughout one’s professional career. This implies that teacher education and teacher professional development programs need to provide intentional, structured opportunities for preservice and inservice teachers to explore their identities. Finding ways to make this attention to identity more overt may be a challenge, as Beauchamp and Thomas (2009) point out, because several complex issues arise: teacher identity formation is constantly shifting; identity change is sometimes difficult not only for “personal” but also “structural” reasons; and, strong emotions and self-beliefs are entangled in the process of change. Therefore, teacher educators and school leaders may need to constantly “invent” new ways of involving preservice and inservice teachers in professional development experiences—ways that take into consideration the multiple aspects discussed earlier: emotion aspects, narrative and discourse aspects, reflection aspects, and agency/structure aspects. This task of supporting identity development, informed by our review, has different implications. For example, the common distinguishing boundaries drawn between “personal” and “professional” identity (see Beijaard et al., 2004) may not be as clear as sometimes portrayed; rather, they may imply deeper identity politics, discourses, and practices (e.g., in relation to race, gender, or class; see Alsup, 2006).

Our review has also implications for future research on teacher identity. Taking a “political” perspective (Mockler, 2011) in studying teacher identity—as opposed to a psychological or a sociocultural lens—changes the claims that can be made about identity by situating teacher identity within certain historical, cultural and political contexts. By understanding teacher identity as historically contingent, for example, teachers, teacher educators, and researchers are enabled to pay attention to the power relations that normalize teachers’ lives (e.g., “teachers are made” versus

“teachers are born” debate). Acknowledging the historicization and politicization of teacher identity helps teachers, teacher educators and researchers analyze and sort through various discourses about teacher identity, allowing them to understand how those discourses operate to fabricate particular meanings about teachers that are circulated through certain practices.

Also, our review suggests the importance of paying careful attention to the contextual specificity of the transaction between larger social forces (macro-political level) and the internal psychic terrain of the individual and his or her working conditions (micro-political level), highlighting the ways that identity claims are politicized in specific locales. An example of this is currently being seen in the United States (and elsewhere) where the foundation-driven “corporate reform movement” in education, with its focus on accountability and free-market models of school choice (Ravitch, 2010), demonizes teachers and teachers’ unions for most if not all of the achievement gap seen between white students and students of color as well as middle-class/wealthy students and students of poverty. Teachers who have a strong identity as independent, creative educators with deep commitment to the learning and well-being of their students are regularly confronted with media-driven depictions of members of their profession as lazy, lacking in accountability, and deserving of punishment. While reality of union flaws of weak teachers is clear and warrants remediation, the result of this bombardment of negative counter-narratives of teachers is a loss of agency, as their voices are not only omitted from the discussion but are frequently vilified as ignorant and not to be trusted, an emotional denigration of the profession with which they have previously identified, producing a decrease in both the sense of efficacy and value required in a successful profession and a diminishment of resources to pursue efficacious teaching practices. Consequently, many good teachers are demoralized, and their sense of identity as successful teachers is shaken; in others, a sense of agency to succeed in the current environment is undermined, and many are leaving the field (Shapiro, 2010). This intersection of narratives is undermining teacher identity, with little attention to how politically driven agendas to privatize public education are sparking and informing these negative counter-narratives (Ravitch, 2010). Within this transactional process of analysis, teacher identities are understood as embedded in culture, ideology, and power relations. Support and nurturance of teacher identity, then, must also occur in the context of culture, ideology, and power relations.

CONCLUSION

In research on teacher identity, it is clear to us that a number of important aspects are involved in the formation of what is conceptualized as “teacher identity”; these aspects complicate our understanding of teacher identity and inform not only the implications for teacher education and teacher professional development but also our way of studying how teachers develop as professionals. The aim of this review was twofold: The first was provide a conceptualization of teacher identity that acknowledges the intersection of identity, beliefs, and politics and the consequences of this acknowledgment in theorizing teacher identity as being politicized, discontinuous, and shifting. The second was to engage in a review of some works focusing on teacher identity to highlight four aspects that seem important in the process of

teacher identity formation: emotion aspects; narrative and discourse aspects; reflection aspects; and agency/structure aspects. We have proposed an understanding of teacher identity that recognizes the intersection of identity, beliefs, and politics, suggesting that this understanding has advantages over primarily a psychological (Rodgers & Scott, 2008) or a sociocultural lens (Beauchamp & Thomas, 2009), because (a) it promotes a more holistic understanding of teacher identity that does not ignore the influence of power relations and politics in teacher identity formation; and (b) it recognizes the prospects of developing a critical and transformative orientation towards the conceptualization of teacher identity. What follows from this conceptualization of teacher identity is a recognition that teacher identity formation is an ongoing process of negotiating one's beliefs, values, emotions, and teaching practices, all in the context of political realities. Future research, then, can incorporate this growing knowledge of the intersection of identity, beliefs, and politics and their influence on teacher identity formation in exploration of other aspects that mark the development of professional identities in teaching.

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11

A MOTIVATIONAL ANALYSIS OF TEACHERS' BELIEFS

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Beliefs (and values) are implicated in all aspects of our lives. Beliefs influence how we attend, interpret, and respond to events and those involved in them, by functioning as “filters,” “frames,” and “guides” (Fives & Buehl, 2012). From the perspective of contemporary analytical philosophy “belief” refers to a mental attitude that some proposition, statement, idea, or fact is true. Beliefs can be both explicitly available for review and reflection and implicitly held and are related to, but distinct from, knowledge (see Schwitzgebel, 2011). Beliefs are the convictions that we generally hold to be true, often without actual proof or evidence. From among the vast array of things individuals believe at any one point in time, only a limited number can be at the fore and available for reflection, thus, we are not necessarily consciously aware of, nor do we actively reflect upon, many of our beliefs.

Psychologists have taken an interest in beliefs which are seen as “underlying states of expectancy” (Rokeach, 1968, p. 2) that guide attitudes, expectations, and specific values; are instrumental in defining behavior; and are implicated in actions and decision making. Beliefs are assumptions that we make about the world, and our values (i.e., what we deem to be important) relate to those beliefs. For example, an individual could believe that all people are created equal. Such a belief would lead to behaviors and attitudes such as treating everyone with respect regardless of sex, race, religion, age, education, or social status. An opposing belief would likely produce discriminatory behaviors and attitudes, such as racism or sexism. Each of us holds a myriad of beliefs about social and physical reality, organized psychologically

but not necessarily represented in a logical form (Rokeach, 1968). Beliefs vary in their centrality; the more central a belief, the more resistant it is to change. Conceptual change is influenced by values, motivations, emotions, and other “hot” factors (Pintrich, Marx, & Boyle, 1993). Changes in central beliefs result in changes to the belief system including changes to more peripheral beliefs (Rokeach, 1968).

Central teachers’ beliefs are those that focus on professional attitudes about education, teaching, and learning; of course, teachers also hold beliefs that are peripherally or unrelated to teaching. Teachers’ beliefs can be explicitly or implicitly held, are strongly and positively interrelated (Pohan & Aguilar, 2001), predict teaching practice and pedagogy (Nespor, 1987; Pajares, 1992; Richardson, 1996), relate to teaching preparation and effectiveness (Mewborn, 2002; Nespor, 1987; Ruddell & Kern, 1986), as well as student outcomes (Kunter, Klusmann, Baumert, Richter, Voss, & Hachfeld, 2013). There is a large body of research concerning the powerful effects of teachers’ beliefs for their students’ achievements in particular, which affect students’ perceptions of competence, learning, and achievement. These beliefs, often communicated nonverbally and unintentionally, are perceived and internalized by students, with direct consequences for their self-efficacy, motivation, effort, and achievement (Rosenthal, 2002). Implicit teachers’ beliefs also have an effect; in the Netherlands elementary school teachers’ implicit prejudices toward ethnic minority students as less intelligent and with poorer school career prospects explained ethnic achievement gaps (van den Bergh, Denessen, Hornstra, Voeten, & Holland, 2010).

Although beliefs and values both constitute fundamental and underlying bases for attitudes and behaviors, values, to this point, have not been comprehensively examined in relation to teachers. Core values have been identified and defined as individuals’ conceptions of what is desirable; values influence how people act and how they appraise the events they experience (Schwartz, 1992, 1994). Ten “universal” values have been proposed from empirical research conducted in 20 countries (Schwartz, 1992, 1994): power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, tradition, conformity, and security. These basic values are likely to underpin more domain-specific values, which act in concert with teachers’ beliefs, to shape teachers’ choices, behaviors, and commitment.

Theories of motivation incorporate domain-specific dual belief and value components. The word “motivation” has its origins in the Latin verb *movere*, meaning “to move,” so that motivation is the study of what moves people to action. Theories of motivation were developed to understand what energizes individuals to engage in tasks (Pintrich & Schunk, 2002) and have been developed in relation to students rather than teachers. This situation changed somewhat over the last decade, as motivation researchers have turned their attention also to teachers. In this chapter, we begin with an overview of each of three major motivation theories—expectancy-value, achievement goal, and self-determination theories—which have thus far been reinterpreted in relation to teachers. This reinterpretation has involved the adaptation of constructs and processes initially designed to understand students’ motivations. We next review empirical findings pertaining to teachers’ motivations and explore cultural differences where these have been identified, paying particular attention to expectancy-value theory within which our work has concentrated. Finally, we raise some methodological issues and conclude with implications for

policy and practice, and suggestions for future research in the field. The relevance and role of beliefs in relation to the study of teacher motivations is highlighted throughout.

HOW CAN A MOTIVATIONAL LENS ADD TO OUR UNDERSTANDING OF TEACHERS' BELIEFS?

Modern motivation theorists have focused on the interrelationships of beliefs, values, and goals with action to engage in tasks (Eccles & Wigfield, 2002). Self-related beliefs such as self-efficacy, competence, or ability, figure prominently as inherent components in motivational frameworks. Teachers' self-related beliefs have been extensively examined in the teacher self-efficacy literature, which has made important contributions to the study of teachers' beliefs for some time (e.g., Tschannen-Moran & Woolfolk Hoy, 2007; Woolfolk Hoy & Burke-Spero, 2005).

Teacher self-efficacy refers to the degree to which teachers believe they are able or feel efficacious to enact certain professional outcomes—such as deploying effective instructional strategies, classroom management, and engaging students (Tschannen-Moran & Woolfolk Hoy, 2001). In general, empirical studies have demonstrated that higher self-efficacy relates to many positive attitudes and behaviors for teachers and students (see Siwatu & Chesnut, Chapter 12, this volume). These include better or more innovative teaching strategies; greater task persistence, resilience, and well-being; and enhanced student motivation and achievement (see Klassen, Tze, Betts, & Gordon, 2011; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Constructs which are conceptually highly related to self-efficacy (such as success expectancies) are important components within broader motivational theories, which incorporate additional values components and antecedent socialization influences, thereby providing larger frameworks within which to study correlates, antecedents, and consequences of teacher self-beliefs.

In expectancy-value theory (EVT; Eccles [Parsons] et al., 1983; Eccles, 2005, 2009), beliefs about the self, in terms of ability and expectancy of success (closely related to self-efficacy and self-concept), are posited to combine with different kinds of values in predicting a range of achievement behaviors such as participation, effort, and persistence. In self-determination theory (SDT; Deci & Ryan, 2000), a belief in one's own competence is considered a basic need underpinning the progression from controlled to autonomous motivation. While not explicitly a factor within achievement goal theory (AGT), self-beliefs of ability are implicated in the adoption and consequences of performance/ego versus mastery/task goals. Those who adopt performance goals are motivated to demonstrate superior ability relative to others, or to avoid the demonstration of perceived inferior abilities; this is in contrast to mastery goals which individuals adopt when they are motivated to focus on tasks for intrinsic reasons such as interest.

The study of teachers' motivations is not in itself a new question; however, research concerning teachers' motivations has, until recently, not drawn upon the motivation literature in an intensive or systematic way. Theories, constructs, and concepts developed in the student motivation literature are now being fruitfully applied to the study of teacher motivation. Motivation researchers are beginning to turn their attention to other aspects of the complex of motivational factors that

demand greater attention and exploration in relation to teachers. In this endeavor, they have extrapolated from well-established motivation theories to ask, first, what kinds of expectancies, values, and goals are relevant for teachers; second, whether and how we can measure them; and third, whether and how they matter, for teachers, students, and schools.

The burgeoning field of teacher motivation research has begun to demonstrate the importance of teachers' motivations for both themselves and their students. Transposing theoretical concepts to the hitherto neglected domain of teaching has required the adaptation and development of theories which were not originally developed to apply to teachers. We have elsewhere described this movement as a "Zeitgeist" (Watt & Richardson, 2008a), in developing theoretically grounded and psychometrically strong approaches to examine teaching motivations within a range of settings. This emergent teacher motivation literature has originated and developed rather separately from the literature concerning teachers' beliefs. However, it is timely to consider what each has in common and ways in which productive cross-fertilization may occur. The theories which have so far been reinterpreted are expectancy-value theory (EVT), achievement goal theory (AGT), and self-determination theory (SDT).

THEORIES OF TEACHER MOTIVATION

EVT, AGT, and SDT have recently been adapted to address pressing questions concerning teachers' motivations for career entry and commitment; efforts and instructional behaviors; and growth and well-being. The choice of theoretical lens has depended upon the outcomes under investigation. We began our empirical work with EVT because it related to the choice of teaching as a career at the initial stage in becoming a teacher. We have examined teaching career motivations from an EVT perspective to identify why individuals choose to pursue teaching as a career, and consequences for their professional engagement, teaching style, and personal well-being (Watt & Richardson, 2007, 2008b). AGT has focused on how teachers strive to feel successful in their daily work. From this perspective, Butler (2007) has demonstrated that the classroom is an achievement arena for teachers as well as students. In the adaptation and application of AGT, because teaching is an interpersonal activity (Butler, 2012), the focal outcomes have been dual, concerning both teachers' development and students' learning. Thus, Butler (2012) has introduced and established a new class of achievement goal for teachers: relational goals, which describe teacher strivings to create caring relationships with their students. SDT focuses more generally on growth and human functioning. Through this lens, teachers' controlled versus autonomous motivations have been explored, and consequences for teachers' quality instructional behaviors versus burnout, as well as for the quality of their students' motivations (see Roth, in press, for a review). Teachers' motivations matter, because if teachers are not able to realize their motivations in particular school contexts, it is likely that professional satisfaction and fulfillment will deteriorate.

Expectancy-Value Theory (EVT)

The expectancy-value model of Eccles and her colleagues (EVT; Eccles, 2005, 2009; Eccles [Parsons] et al., 1983) sets out the importance of individuals' expectancies, values, and background socialization influences in shaping their achievement-related

choices, over and above their demonstrated skills and abilities. Although developed as a framework to explain senior high school mathematics enrollments (Eccles [Parsons] et al., 1983), it has since fruitfully been applied to other academic school disciplines (for example, English and Language Arts [Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Watt, 2004]; and sport [Fredricks & Eccles, 2002]), as well as to specific types of careers (e.g., Watt, 2002, 2006; Watt et al., 2012).

Expectancies refer to beliefs about how well an individual will perform on an impending task (Eccles [Parsons] et al., 1983), and are shaped over time by her or his experiences and interpretations of those experiences (see Eccles & Wigfield, 1995). If someone performs a task successfully, she is likely to have her self-beliefs bolstered by the success and expect to succeed at similar tasks in the future; conversely for someone who experiences lack of success or failure. However, ability beliefs describe just one aspect of how individuals relate to tasks. It is also necessary to take into account the value that the individual places on a task. This is influenced by a number of dimensions: does the person enjoy the task? (intrinsic value); is the task instrumental for any of the person's long- or short-term goals? (utility value); does she or he think the task is suited to people like her or him? (attainment value); and, will it be worth the effort required to be successful? (cost value).

EVT conceptualizes and organizes these four classes of values, which relate to how a task meets individual needs (Eccles [Parsons] et al., 1983; Wigfield & Eccles, 1992). Intrinsic value is the enjoyment one derives from carrying out a given task, which has been described as similar to the construct of intrinsic motivation defined by Deci and colleagues (Deci & Ryan, 1985; Deci, Vallerand, Pelletier, & Ryan, 1991) and by Harter (1981), as being concerned with engaging in a task out of interest or enjoyment. Utility value refers to how a task will be useful to an individual in the future, and has some resemblance to extrinsic motivation (Deci & Ryan, 1985; Harter, 1981), in that it taps more instrumental reasons for engaging in a task such as how it fits into a person's future plans. Attainment value relates to the extent to which performance on a particular task provides opportunities for the individual to fulfill a number of identity-related needs. Cost is the negative values component which refers to what the individual has to sacrifice to carry out the task. Cost could include factors such as anxiety, fear of failure or success, and potential loss of self-worth. Task difficulty beliefs are posited to influence achievement-related outcomes via expectancies and values (Eccles [Parsons] et al., 1983, Wigfield & Eccles, 2000), although there has been little research directly addressing those relationships.

EVT and teachers. Previous research into what motivates teachers to enter the profession has resulted in a steady flow of studies from many countries, of which a significant proportion has been conducted in the United States. A seminal review concluded that “altruistic, service-oriented goals and other intrinsic motivations are the source of the primary reasons entering teacher candidates report for why they chose teaching as a career” (Brookhart & Freeman, 1992, p. 46). Since then, an OECD report (2005) reported the most common motivations for teaching to be the desire to work with youth, potential for intellectual fulfillment, and to make a social contribution, based on studies from France, Australia, Belgium (French Community), Canada (Québec), the Netherlands, the Slovak Republic, and the U.K. The desire to work with children and adolescents has been identified as central in many studies (e.g., Fox, 1961; Joseph & Green, 1986; Kyriacou & Coulthard, 2000; Lortie, 1975; Tudhope, 1944; Valentine, 1934), whereas “extrinsic motives” such as

salary, job security, and career status have been more important in different socio-cultural contexts such as Brunei (Yong, 1995), Zimbabwe (Chivore, 1988), Cameroon (Abangma, 1981), the Caribbean (Brown, 1992), Jamaica (Bastick, 1999) and Turkey (Kılınç, Watt, & Richardson, 2012). However, the absence of an agreed theoretical and analytical framework has meant researchers have not always shared understandings of what constitutes intrinsic, altruistic, extrinsic, or other motivations. For example, the desire to work with children has at times been regarded as an intrinsic (e.g., Young, 1995), and at other times an altruistic motivation (e.g., Yong, 1995). Varying conceptualizations and operationalizations have resulted in a lack of definitional precision and overlapping categorizations.

EVT provided a particularly useful and cohesive framework to organize and guide research concerning the motivation to choose a teaching career. Motivations previously identified as influential in the teacher education literature were mapped to constructs in the expectancy-value framework, allowing us to locate previously identified motivations *within* an integrative and comprehensive model, which suggested additional important motivations. Our FIT-Choice (Factors Influencing Teaching Choice; www.fitchoice.org) program of research began at its outset with the development of the FIT-Choice scale, designed to allow comparative measurements of teacher motivations locally and elsewhere.

The FIT-Choice model taps the “altruistic”-type motivations emphasized in the teacher education literature (e.g., Book & Freeman, 1986; Brown, 1992; Lortie, 1975; Moran, Kilpatrick, Abbott, Dallatt, & McClune, 2001; Serow & Forrest, 1994) as well as more personally utilitarian motivations and intrinsic motivations, together with ability-related beliefs which are the focus of the broader career choice literature (see Lent, Lopez, & Bieschke, 1993). In addition to self-beliefs and values, the FIT-Choice model includes perceptions about the teaching profession (task-beliefs). These reflect perceived demands (heavy workload, emotional demand, hard work) and rewards (salary and social status), the imbalance between which we conceptualize as a “cost.” We have provided a review elsewhere (Watt & Richardson, 2008b) of how the FIT-Choice factors map to expectancy-value theory, Social Cognitive Career Theory (SCCT; see Lent Lopez, & Bieschke, 1993), and to key findings within the existing teacher education literature. All parts of the model are proposed to work together to predict choice of a teaching career and professional engagement outcomes.

Specific motivations in the FIT-Choice model (see Figure 11.1) are teaching ability beliefs, intrinsic value, personal utility values (job security, time for family, job transferability), social utility values (shape future of children/adolescents, enhance social equity, make social contribution, work with children/adolescents), social influences (of friends, family, or work colleagues thinking one should become a teacher), positive prior teaching and learning experiences, and the negative motivation of having chosen teaching as a “fallback” career in light of claims in the teacher education literature and the public media wherein entrants may have failed to be accepted into their career of choice or otherwise unable to pursue their first-choice career (see Book, Freeman, & Brousseau, 1985; Haubrich, 1960; Robertson, Keith, & Page, 1983).

Social utility value factors resemble altruism as variously described in the teacher education literature (Book & Freeman, 1986; Brown, 1992; Fox, 1961; Joseph & Green, 1986; Serow, Eaker, & Ciechalski, 1992). Personal utility values tap various

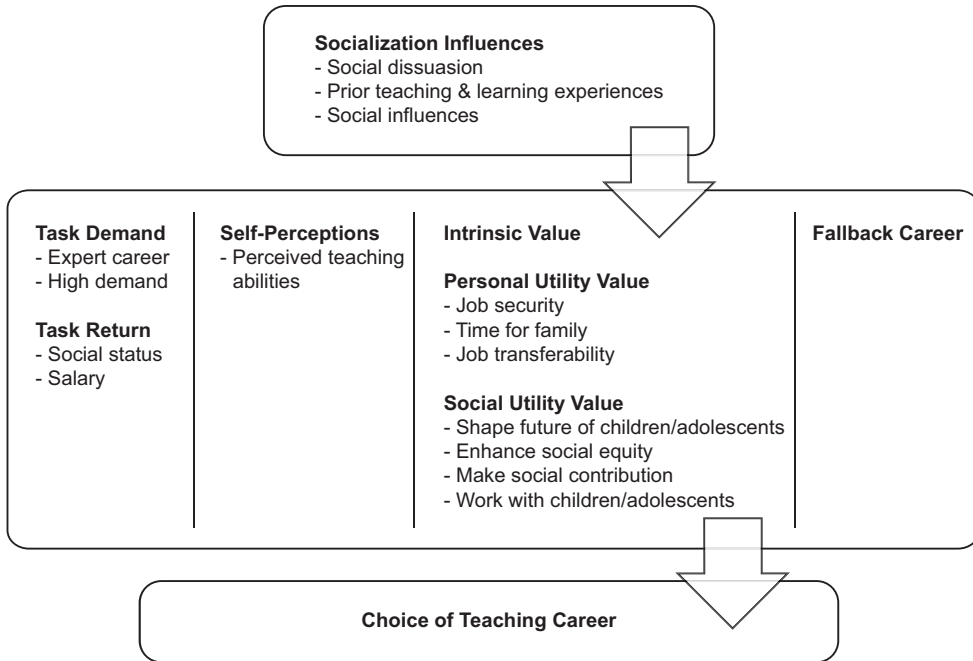


Figure 11.1 FIT-Choice empirically validated theoretical model.

quality of life issues such as having time for family and job security (Bastick, 1999; Jantzen, 1981; Richardson & Watt, 2006; Robertson et al., 1983; Tudhope, 1944; Yong, 1995). Such values resonate with beliefs about what constitutes a balance between work and life, how to achieve that balance, and the type of occupation that provides for a secure future. These personal factors have typically been nominated as extrinsic motivations in prior research, although that label obscures the distinction from factors which we distinguish as socialization influences and task perceptions.

The FIT-Choice measurement platform allows for the identification of which motivations and task beliefs are more and less important for choosing teaching as a career. It also permits comparisons across settings including Australia (Richardson & Watt, 2006), the United States (Lin, Shi, Wang, Zhang, & Hui, 2012; Watt, Richardson, et al., 2012), Norway (Watt, Richardson, et al., 2012), Croatia (Jugović, Marušić, Ivanec, & Vidović, 2012), Germany (König & Rothland, 2012; Watt, Richardson, et al., 2012), China (Lin et al., 2012), and Turkey (Kılınç, Watt, & Richardson, 2012). Fallback career motivations were uniformly low, except in China and Turkey, likely reflecting the availability of work within those job markets. Ability and intrinsic motivations were highly rated among all but the samples from China and Turkey, in which collectivist cultures career choices may be less based on individual interests and abilities; or, more basic needs such as job security may have primacy in a developing nation such as Turkey, on which that sample indeed scored highest. Social utility values were high in general, but notably lowest in the Chinese sample, and in between for the German. Social values may be taken more for granted in collectivistic Chinese culture, and the tracked school system in Germany could mean

future teachers perceive lower agency to achieve social equity outcomes and youth opportunities through educational structures. Personal utility values were strikingly similar and rated moderately across samples, presumably reflecting basic needs in contemporary society, although the Turkish sample rated job security somewhat higher as already mentioned.

In general, future teachers believed teaching to be a highly demanding career (including heavy workload, emotional demand, and hard work), with low rewards in terms of salary and social status. The Chinese and especially the Turkish sample rated the demands of teaching substantially lower, possibly due to the collectivist approach to teacher development and group accountability in the Chinese sample, and the relative demandingness of alternative available work in the developing Turkish context. Perceptions of higher salary in the German setting reflected objective context differences. Values about teaching as a socially responsible and morally worthwhile career starkly contrast with fallback and personally utilitarian values, or beliefs that monetary rewards and status are important career outcomes.

EVT further posits that expectancies and values predict domain-specific achievement behaviors, such as performance, efforts, and persistence. Yet, little is known about the long-term effects of initial teaching motivations. Can they have lasting effects on professional engagement and even on beginning teachers' subsequent teaching styles? Results from our longitudinal study highlight an enduring effect of initial motivations for choosing teaching, which influence professional engagement and teaching styles up to eight years later. We have examined how initial motivations for teaching (incorporating values and beliefs components) influenced professional engagement and career development aspirations (PECDA; Watt & Richardson, 2008b), and self-reported teaching style (TSS; Watt & Richardson, 2007), using longitudinal Australian FIT-Choice data spanning entry to (Time 1) and exit from teacher education (Time 2), up until 8 years of teaching experience (Time 3). Intrinsic and ability (self-belief) motivations to teach at Time 1 predicted Time 3 positive teaching behaviors, as did social utility values through their influence on whether participants planned to remain in the profession at Time 2 (Watt, Richardson, & Devos, 2013). Conversely, fallback career motivations subsequently lowered professional engagement and career development aspirations, and reduced positive teaching behaviors during early career. Social influences, such as being persuaded by family, friends, or others to become a teacher, led to negative teaching practices.

The most adaptive motivations for choosing teaching as a career were thus ability self-beliefs, and wanting to work with youth to be instrumental in shaping their futures and make a social contribution by enhancing social equity (social utility values)—which resonate with teachers' adaptive mastery and relational goals orientations identified by Butler (2012; see section following). Problematic motivations were clearly fallback career and, interestingly, social influences, which predicted teaching negativity (including responding negatively or angrily to students' mistakes, use of sarcasm, or deliberate embarrassment; Richardson & Watt, *in press*). We interpret the negative consequences from social influence motivations in terms of SDT discussed later in the chapter. Within the SDT perspective, choosing a teaching career based on persuasion from others suggests a "controlled" motivation, rather than a positive "autonomous" motivation. This has implications for teacher

recruitment efforts; the negative effect of social influences needs to be carefully considered when persuading individuals to enter into the teaching profession.

Our continuing program of research addresses several core issues: (a) why choose the career of being a teacher?; (b) why do people stay in the job, burnout, or leave?; (c) how do motivations intersect with sociocultural factors to impact teachers' professional development and personal well-being?; and, (d) what types of profiles are evident in teachers' career trajectories? Such questions require following the same individuals over an extended period of time to address critical issues in the current climate of teacher shortages and concern regarding teacher quality—with implications for policymakers, employers, and teacher educators. Longitudinal data allow the real, and necessary, opportunity to explore and test how processes unfold over time to produce outcomes.

Achievement Goal Theory

Achievement goal theory (AGT) originally distinguished a task (or mastery) goal orientation from an ego (or performance) one (Dweck & Elliot, 1983; Nicholls, 1984). Since then, the trichotomous goal framework was proposed (Elliot & Church, 1997; Elliot & Harackiewicz, 1996; see also Nicholls, 1989), which distinguished *performance approach* from *performance avoidance* goals, additional to *mastery goals*. Individuals who hold a performance approach goal are motivated to demonstrate their abilities relative to others, in contrast to those who hold a performance avoidance goal and are motivated to avoid demonstrating their relative lack of ability. A parallel distinction was subsequently proposed for mastery goals in the 2×2 achievement goal framework (Elliot, 1999; Elliot & McGregor, 2001; Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002; Pintrich, 2000a, 2000b) which introduced a mastery avoidance goal, defined as a focus to avoid misunderstanding, not learning, or not mastering a task. Empirical support for the 2×2 goal structure has been found (e.g., Elliot & McGregor, 2001; Bong, 2009; Nien & Duda, 2008; Njouku, 2007; Sideridis, 2008), although “classical” goal theorists have not all embraced the mastery avoidance construct (e.g., see the debate in the *Journal of Educational Psychology*, 2002). The two approach goal orientations have been found to relate to more positive predictors and outcomes, with mastery approach being the most positive. On the other hand, performance avoidance goals lead to maladaptive outcomes, particularly when self-beliefs of competence are low (Law, Elliot, & Murayama, 2012).

AGT and teachers. In the program of research conducted by Butler and her colleagues, achievement goal theory has been creatively and systematically adapted to the study of teacher motivation, because the school has been found to be an achievement arena not only for students, but also for teachers who strive to feel successful in their work, although teachers differ in their beliefs about what constitutes success, and thus in their goal orientations for teaching. Teachers' goals can similarly be conceptualized in terms of mastery, performance approach, and performance avoidance dimensions. Further, strivings to attain close and caring relationships with students have been identified as a distinct new class of teachers' “relational goals” (Butler, 2012). Within AGT, Butler's work has been significant in tapping previously unidentified teacher motivations, goals, values, and beliefs about the relational work

inherent to being a teacher. This line of research has established important links between teachers' achievement goals, patterns of communication and behavior in the classroom, and students' resultant learning and achievement outcomes (Butler, 2007, in press; Butler & Shibaz, 2008).

Similar to patterns of findings concerning students' achievement goals, teachers' mastery goals were associated with positive outcomes including adaptive coping and engagement, mastery-oriented instruction, and their students' engagement (see Butler, in press). Performance avoidance goals (to avoid the demonstration of poor teaching ability) showed clear negative outcomes including defensive avoidance of help, self-handicapping, burnout, career dissatisfaction, and surface approaches to instruction involving more competitive classroom climates. Patterns for performance approach goals (to prove ability) were less clear-cut. Findings concerning the newly identified class of relational goals showed these teachers provided greater socioemotional support to students (see Butler, 2012; Butler, in press).

Self-Determination Theory

Self-determination theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000) focuses on the social-contextual conditions which facilitate processes of self-motivation and healthy psychological functioning. SDT is founded on the assumption of three basic human psychological needs—for competence, autonomy, and relatedness (Ryan & Deci, 2000). When these three needs are met people experience autonomous motivation and perceive themselves as “origins” of their own behavior, rather than externally controlled “pawns.” Within this perspective, extrinsic motivations can become internalized through a process of progressive integration with a person's sense of self. There are five self-regulatory styles: (a) *external* regulation means no internalization has occurred and motivators are external; (b) *introjection* is a partial internalization whereby the goal has been taken in but not really accepted as the individual's own; (c) in *identified* regulation, the person has understood the activity as something important for her or his own long-term goals; (d) the last type of extrinsic motivation is *integration*, where an identified motivation becomes assimilated with other well-assimilated aspects of the self; (e) finally, *intrinsic* motivation is also an autonomous motivation. The important differentiation drawn by these theorists is between autonomous (or self-determined) and controlled motivations. Autonomous motivation involves volition and choice, controlled motivation involves an external or internal sense of compulsion (Assor, Roth, & Deci, 2004; Grolnick et al., 1997). It is possible that initially autonomous motivations could turn to controlled motivations; for example, when an initial decision (such as to become a teacher) is autonomous, but then actually doing the work entails a sense of compulsion or external responsibility. A large literature has examined predictors of students' autonomous motivation, and benefits for their engagement and well-being (see Ryan & Deci, 2009).

SDT and teachers. Unlike the extensive research that has focused on predictors of students' autonomous motivation (e.g., Reeve, 2002), the research on teachers is quite scarce (see Roth, in press). In studies of teachers, autonomous motivations have been associated with perceived accomplishment, teaching self-efficacy, autonomy supportive teaching practices, and reduced burnout. Based on measures with

students, Roth, Assor, Kanat-Maymon, and Kaplan (2007) in Israel adapted and developed measures of teacher motivations from more controlled to more autonomous, in relation to why teachers carry out specific, common teaching tasks. Examples of controlled teacher motivations include to avoid parent complaints or feelings of guilt; autonomous motivations include to let children feel teachers care about them, or to be in touch with children and adolescents (Roth et al., 2007).

Consistent with theoretical predictions, teachers' feelings of accomplishment increased as teachers moved along the continuum from external to intrinsic motivations; the reverse was true for negatively increasing correlations with burnout (Roth et al., 2007). Findings for burnout were replicated by Fernet, Senécal, Guay, Marsh, and Dowson (2008) in Francophone Canada, who also examined relationships of teacher motivations with self-efficacy. Intrinsic and identified motivations were positively, and interjected and external motivations negatively, associated with teaching self-efficacy measured by the French-Canadian version (Fernet, Senécal, & Guay, 2005) of the Classroom and School Context Teacher Self-Efficacy Scale (Friedman, 2003). The scale encompassed items related to instruction, discipline, and consideration of students, which were analyzed as one composite factor. Autonomous teacher motivation has additionally been found to associate with autonomy supportive teaching practices that furnish choice and relevance to students (Fernet, Guay, Senécal, & Austin, 2012; Pelletier, Seguin-Levesque, & Legault, 2002; Roth et al., 2007; Taylor & Ntoumanis, 2007; Taylor, Ntoumanis, & Standage, 2008).

APPROACHES TO THE STUDY OF TEACHER MOTIVATIONS AND BELIEFS

Our review of teacher motivation research from the theoretical perspectives of EVT, AGT, and SDT has highlighted the theoretical adaptations involved in the study of teachers, the role of self- (and task-) beliefs within each, and empirical findings so far. In this section, we discuss etic and emic approaches to the study of teacher motivations and beliefs, with particular reference to extensive cross-cultural, and intensive situated studies. Human beings develop throughout their life-span and are engaged in specific cultural contexts where they have shared assumptions about how the world is, and how all aspects of daily life are conducted. In the formation of motivations, beliefs, and values, we might expect that different macro-level cultural factors, ensconced in social and cultural practices, behaviors, and events, together with the micro-level interactions between individuals and groups, dynamically interact. Thus, motivations, beliefs, and values do not exist independently of the individuals who hold them in specific social and cultural contexts.

Etic Approaches

Etic approaches describe phenomena in terms that can be applied across cultures. Teacher motivation, beliefs, and values are located within macro- and micro-level social and cultural systems constituted by political policies, organizational systems, policies, and practices at the level of the district and school. Since teachers operate within these environments located in particular sociocultural settings, it is likely that these settings will form and fashion teachers' motivations, beliefs, and values.

With the development of common measurement platforms from which to approach the study of teacher motivations across studies and settings, it becomes possible to directly compare and contrast how motivations differ across samples and contexts. As discussed earlier in this chapter, we already know that the relative importance of individuals' various motivations for choosing teaching as a career differs according to broad sociocultural factors.

Disturbingly, evidence is accumulating to demonstrate that present school accountability reforms in the West serve to undermine teachers' adaptive mastery and relational goals and promote maladaptive ability and work avoidance goals (Butler, in press), also, to reduce teachers' autonomous motivations and promote controlled motivations (Roth, in press). Kieschke and Schaarschmidt (2008) conducted an extensive study on teachers' professional commitment and health in Germany and expressed concern about the consequences of regimentation and external interference in teaching; they recommended that: (a) teachers need to be given more autonomy in their work to allow for self-determined professional goals; (b) excessive demands from overwhelming educational tasks that are completed alone need to be minimized; and (c) teachers need clearer separation of life at school and leisure time; school tasks often undertaken in the evening and on weekends allow little opportunity for emotional distancing, recovery, and regeneration. In a teaching-for-testing culture such as China (see Ho & Hau, in press for a review), it is possible that findings would differ, if there is a match between individuals' and cultural beliefs and values concerning the nature of the teachers' role and student learning.

Theories for understanding achievement behavior in the West have focused on the individual as the unit of analysis, based on the concept of an independent and autonomous self. In contrast, the interdependent self (Markus & Kitayama, 1991) is more prominent in the East. Consequently, teacher motivation involves seeking consensus about what works for the common goal, or so-called "middle way" (Gao, 2010; Tsui & Wong, 2009), and a reflection of the *yin-yang* philosophy in which opposites are considered interdependent and mutually supportive (Hue, 2008). In their review, Ho and Hau (in press) wonder what role individual differences in teachers' expectancies, values, goals, and control beliefs play in the more collectivist-oriented cultural context. For example, Klassen et al. (2008) found that Singaporean teachers' collective self-efficacy beliefs strongly mediated the effects of student socioeconomic status on perceived school climate; likely due to teachers' belief in the interactive and collective influence of the staff as a whole. In contrast, Canadian teachers in an individualistic culture may maintain a focus on individual professional development rather than the agency of the group.

Ho and Hau (in press) explained that the existence of cultural factors should not lead us to conclude that theorization and research can only be carried out within its culture-specific meaning (an emic perspective), and that comparisons which involve same constructs and measures across settings are also important to identify where differences may occur (an etic perspective). However, at the same time, they caution against transporting Western constructs directly into other contexts without first examining the meaning and underlying assumptions of the constructs (see Karabenick, et al., 2007). Although a substantial literature has accumulated concerning Chinese students' learning motivations (see Hau & Ho, 2010, for a review), similar systematic investigation of teacher motivation is in its infancy.

Emic Approaches

Situated approaches (e.g., Nolen, Ward, & Horn, 2011; Turner & Patrick, 2008) involve interpretative analyses of interview and observation data. Such studies do not seek generalization as their goal, but undertake more nuanced examination of a phenomenon or setting. Situated studies offer the possibility to understand how teacher motivations develop, become salient, change, and are expressed in dynamic interaction with particular student, classroom, and school factors. The conduct of both nuanced situated studies alongside large-scale longitudinal studies seems to us to be critical to understand the what and the why of teacher motivations, how they develop and are expressed, and why they matter.

In the research concerning teacher motivation there has been a greater concentration thus far on psychological variables, and less attention to contextual or situated aspects (with the exception of the situated approaches). Sensitive, sound, robust theories and measurements are additionally needed at the level of contextual effects, to determine in comparative studies how different workplace environments nurture or constrain teachers' motivations. Developments in multilevel modeling allow us to examine individuals within settings, to begin to parse the impacts of person and school characteristics on teacher motivations, engagement, and emotions (e.g., Klusmann, Kunter, Trautwein, Lüdtke, & Baumert, 2008). In this endeavor, methods beyond self-report surveys are required. Experience sampling is one method that can provide insight into teachers' beliefs, motivations, and experiences during the act of teaching, enabling moment-to-moment information that may not be accessible if sought after the event. Such a method allows us to examine the exercise *in situ* of teachers' beliefs, values, and motivations in classrooms (e.g., Carson, Weiss, & Templin, 2010; Keller, Frenzel, Goetz, Pekrun, & Hensley, 2013; Malmberg, 2010).

Both etic and emic approaches will be important to progress the burgeoning body of work concerning teachers' beliefs and motivations, incorporating methodologies additional to self-report, such as observations and experience sampling. Motivational lenses offer the opportunity to examine relationships within and consequent upon the broader systems within which teacher self-beliefs reside. It is only now that we are beginning to understand some of the core values, beliefs, and expectancies that attract people into teacher education, as well as those that influence their daily practice and students' outcomes, and sustain teachers as healthy and effective professionals, within particular sociocultural and contextual settings. Researchers need to continue to address the motivations and psychological supports that beginning teachers require to sustain their "fitness to practice." It is intriguing that only recently have teachers' own outcomes been considered important in their own right, and not only as they impact students.

On the other hand, what can the burgeoning literature on teachers' beliefs offer the developing field of teacher motivation? The teachers' beliefs literature has encompassed a diversity of beliefs including, but not limited to, self-beliefs. Other beliefs, particularly task-related and sociocultural beliefs, hold promise to enrich the study of teacher motivation. Indeed, these other kinds of beliefs are important yet under-studied factors in EVT; task beliefs are also directly implicated in mastery goals within AGT. The two bodies of literature—teacher motivation and teachers' beliefs—have developed rather independently and yet, each has much to offer the

other. It is timely to marry them in a way that goes beyond simple addition or a pastiche, and systematically fosters theoretical cross-fertilization and hybridization.

OUTLOOK AND FUTURE DIRECTIONS

There is an urgent need for reliable, large-scale, long-term, cross-cultural data, incorporating extensive quantitative measures alongside targeted rich qualitative components, to examine the what and the why of teacher motivations and development. In this pursuit, we may not necessarily wish to keep measuring the same motivational factors over time. We are presently lacking a coherent developmental theoretical approach to the study of teachers' motivations throughout their career. It may be that different theories will be important to understand different developmental stages. For example, EVT may be most relevant to the choice of teaching as a career, AGT for teachers' daily practices, and SDT to the promotion of generally autonomous motivated behavior.

There will very likely not be a single stage model we can come up with to describe the development of teachers' motivations and beliefs. We already know that, in many Western and European countries, up to 50% of teachers leave within their first five years (Chang, 2009; Henke, Chen, & Geis, 2000; Ingersoll, 2003; Johnson & Birkeland, 2003; MCEETYA, 2003; OECD, 2005; Preston, 2000), established in the United States to be due to a "revolving door" through which large numbers of teachers depart teaching long before retirement (e.g., Ingersoll, 2001, 2012; Ingersoll & Strong, 2011). By contrast, where teachers are accorded better pay and conditions such as in Scotland, Ireland, Sweden, Finland, and Iceland, there are fewer recruitment and retention problems than in countries where the pay and conditions of the profession are lower. It is important to examine the motivations that sustain people in the profession versus those that deter or push people away, which may not simply be opposite sides of the same coin.

We expect that different kinds of school contexts will afford the realization or not of teachers' motivations, which, if left unfulfilled, are likely to create a double-edged sword that could lead to burnout and disappointment. For example, teachers who are motivated to work with youth and enhance social equity, may (and do) find themselves frustrated and dispirited when their time is taken up by administrative and accountability work which takes them away from what they regard as their core responsibilities. This has begun to create a disjuncture between why teachers want to teach, and the work they are required to spend their time doing. People who became teachers because they want to work with children and adolescents become less satisfied with their work, if it means they have little time to engage in relational work on a daily basis. In this way, the same motivations can be a driving force for good or ill, dependent on the degree of match between a teacher and her or his teaching environment.

In determining which beliefs and motivations are adaptive versus maladaptive, it is essential to understand what outcomes are predicted by different beliefs and motivations, within what contexts. Deciding which outcomes ought to serve as outcome criteria in this endeavor will be a non-trivial matter. It is also necessary to determine antecedents to, and stability versus malleability of, beliefs and motivations that are identified as positive or negative, before implications for policy and practice can be clarified. For instance, stable and non-malleable factors may be best considered at

selection into teacher education, whereas changeable or malleable factors ought to be addressed during teacher education and early career induction. To adopt identified positive beliefs or motivations as selection criteria into teacher education at this point, in our view, would be premature and insufficiently informed.

It is further necessary for teacher education to equip beginning teachers with coping strategies to effectively deal with everyday problems and the capability to self-manage stressful events to support and protect themselves psychologically and emotionally (Kieschke & Schaarschmidt, 2008). Such goals are given considerable attention in the preparation of clinical and school psychologists, and ought to be incorporated as a specific course within initial teacher education programs and early career professional development. Although mentoring programs for beginning teachers have been introduced in many countries, the success of the programs has been negatively impacted by inappropriate mentor matches, and low levels of appropriate mentor and mentee interaction and support (see Kardos & Johnson, 2010; Wang & Odell, 2002). They have also not been designed to specifically address the psychological and emotional dimensions of teachers' work.

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12

THE CAREER DEVELOPMENT OF PRESERVICE AND INSERVICE TEACHERS

Why Teachers' Self-Efficacy Beliefs Matter

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In 1977, Albert Bandura introduced the construct of self-efficacy in his often-cited article "Self-efficacy: Toward a Unifying Theory of Behavioral Change." Bandura (1997) defined self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). Stated differently, self-efficacy is an individual's belief about what he or she can do successfully (Bong, 2006). Despite the construct's brief history, a growing body of empirical evidence supporting Bandura's theory of self-efficacy and the construct's ability to predict future behavior has led to its increased popularity. In the past 36 years, educational researchers have examined the construct of self-efficacy in the context of teaching (e.g., Tschannen-Moran & Woolfolk Hoy, 2001) and the antecedents and consequences of a teacher's self-efficacy beliefs (Tschannen-Moran & Woolfolk Hoy, 2007; Woolfolk Hoy & Davis, 2006). In this context, teacher self-efficacy is defined as "individuals' beliefs in their capabilities to perform specific teaching tasks at a specified level of quality in a specified situation" (Dellinger, Bobbett, Oliver, & Ellett, 2008, p. 752).

It is a common practice among teacher self-efficacy researchers to introduce their studies by first attempting to highlight the importance of teachers' self-efficacy beliefs. To accomplish this, researchers often included numerous citations of research studies published before 1997 that describe the link between a teacher's self-efficacy beliefs and student outcomes such as academic achievement and student motivation (Klassen, Tze, Betts, & Gordon, 2011; Wyatt, 2012). In many cases, however, the cited studies suffer from methodological flaws (e.g., use of an invalid self-efficacy instrument) that make drawing inferences from these studies difficult (Skaalvik & Skaalvik, 2008; Wyatt, 2012).

Complicating matters is that between 1998 and 2009, very few studies were conducted to examine the link between teachers' self-efficacy beliefs and student outcomes (Klassen et al., 2011). Unfortunately, this is an area that is under-researched. According to Klassen et al. (2011), between 1998 and 2009, only 2.8% of published teacher self-efficacy studies examined the link between these variables. Klassen et al. concluded that there is only modest support for the hypothesized relationship between teachers' self-efficacy, effective teaching practices, and student learning outcomes. This modest support has led some researchers to question the usefulness of teacher self-efficacy research (Wheatley, 2005). This question has prompted researchers to conduct critical reviews of teacher self-efficacy research (e.g., Klassen et al., 2011; Wheatley, 2005; Wyatt, 2012). These reviews have provided valuable guidance to researchers who are looking to deepen the field's understanding of how self-efficacy beliefs develop, how self-efficacy beliefs can be accurately assessed using quantitative and qualitative methods of inquiry, and the relationship between teachers' self-efficacy beliefs and student outcomes.

Stemming from these reviews of teacher self-efficacy research, we were left to ponder the value of teacher self-efficacy research, especially in light of the modest support for the hypothesized relationship between a teacher's self-efficacy beliefs and student learning outcomes. We were quickly reminded, however, of two quotes from Bandura (1997): "people avoid activities and environments they believe exceed their capabilities, but they readily undertake activities and pick social environments they judge themselves capable of handling" (p. 160) and "the power of efficacy beliefs to affect the course of life paths through selection processes is most clearly revealed in studies of career choice and development" (p. 161). We believe that these quotes reflect a perspective that can be used to understand why it may be difficult to recruit highly qualified individuals into the teaching profession and why it is difficult to retain those that choose the teaching profession (Ingersoll & Smith, 2003).

The purpose of this chapter is to examine the role of self-efficacy beliefs in the career development of teachers.¹ To accomplish this we first briefly highlight problems associated with recruiting and retaining highly qualified teachers. Next, we use social cognitive career theory to assist us in describing how teachers' self-efficacy beliefs can influence their career-related interests, goals, intentions, and performance. With a better understanding of the relationship between self-efficacy and career decision-making, we offer some suggestions that can be used to assist teachers in developing resilient self-efficacy beliefs. Finally, we conclude the chapter with two recommendations for future research.

CONTEXTUALIZING THE PROBLEM

A vast amount of research on the challenges associated with recruiting and retaining highly qualified teachers has been conducted in recent years (see Berry, 2004; Ingersoll & May, 2011). This is a well-studied area of research and a thorough review is beyond the scope of this chapter. However, we would like to highlight three problems related to the recruitment and retention of high quality teachers.

First, while universities across the nation are successful in preparing more new teachers than the annual market demands, there are some teaching fields that experience shortages (Darling-Hammond & Sykes, 2003). Data suggest that there is an insufficient pool of qualified math and physical science teachers, especially concerning those who are qualified to teach students with limited English proficiency and disabilities (Boe & Cook, 2006; Urban Teacher Collaborative, 2000). Second, contrary to popular belief, retaining teachers is a larger problem than preparing new ones (Darling-Hammond & Sykes, 2003). While the number of teachers prepared annually will meet market demands, the number of teachers who leave the profession prematurely (i.e., within the first five years of service) varies between 5% and 30% (Ingersoll, 2003). Third, teacher attrition is highest in urban schools with a high percentage of low income, high poverty, and minority students (Lankford, Loeb, & Wyckoff, 2002). While urban schools are relatively successful in hiring new teachers, many of the new hires are often inexperienced and in the early stages of their teaching careers (Chizhik, 2003; Darling-Hammond & Sykes, 2003; Lankford et al., 2002).

Several factors influence our ability to recruit and retain highly qualified teachers (Darling-Hammond & Sykes, 2003; Ingersoll, 2003). Drawing from social cognitive theory, we believe that teachers' self-efficacy beliefs can influence their career aspirations and career longevity. For example, teachers who are inadequately prepared to teach may doubt their capabilities to manage daily classroom challenges and thus are likely to experience higher levels of burnout, resulting in a decision to leave the profession (Schwarzer & Hallum, 2008; Skaalvik & Skaalvik, 2007). To better understand the role of self-efficacy in teachers' career decision-making, we draw from social cognitive career theory (Lent, Brown, & Hackett, 1994). We believe that examining teacher self-efficacy from this theoretical framework will help shed light on the value of a teacher's self-efficacy beliefs on his or her decision to pursue a teaching career and to remain in the profession.

SOCIAL COGNITIVE CAREER THEORY

Overview

Social cognitive career theory (SCCT; Lent et al., 1994), an extension of Bandura's social cognitive theory (SCT; Bandura, 1986), is used to explain the processes through which career interests develop, choices regarding educational and career paths are made, and success in academic and career engagements is accomplished (Brown & Lent, 2006; Lent & Brown, 1996). Relying upon the internal and external variables that influence everyday life, SCCT focuses on three variables that work together to facilitate personal agency in decision-making and career development: (1) self-efficacy, (2) outcome expectations, and (3) goals (Brown & Lent, 2006; Lent & Brown 1996; Lent et al., 1994).

Self-efficacy beliefs are dynamic, context-specific appraisals that individuals maintain about their ability to successfully engage in certain behaviors and tasks (Bandura, 1977, 1997). Influenced by everyday activities, self-efficacy beliefs can vacillate based upon an individual's interpretations of mastery and vicarious experiences, physiological arousal, emotional reactions, and verbal persuasion (Bandura, 1997; Usher & Pajares, 2008). SCCT researchers would suggest that a teacher's

self-efficacy beliefs to successfully engage in tasks specific to the profession (e.g., classroom management techniques) may influence their decision to pursue a career in the teaching profession and their decision to remain in the profession (Brown & Lent, 2006; Lent et al., 1994).

Outcome expectations are the second social cognitive variable that plays an important role in SCCT. Outcome expectations are the beliefs that individuals hold about the consequences of engaging in certain behaviors and tasks (Bandura, 1977). Outcome expectations can develop in one of two ways (Bandura, 1986). Outcome expectations can develop as a result of firsthand experience. For example, a teacher learns from firsthand experience that a particular strategy to teach his or her students fractions will not result in desirable learning outcomes. On the other hand, an outcome expectation can develop when consuming secondhand information (e.g., observing a model; Bandura, 1986, 2001). For example, a pre-service teacher may develop positive outcome expectations concerning culturally responsive teaching after having observed a mentor teacher engage in culturally responsive teaching practices resulting in positive responses from students. It is important to note that while research findings suggest that both self-efficacy and outcome expectations can influence an individual's career decision making, self-efficacy beliefs play a more influential role in this process (Bandura, 1977; Brown & Lent, 2006; Lent et al., 1994).

Goals represent the third social cognitive variable that plays a vital role in SCCT. Lent, Brown, and Hackett (2002) define goals as “the determination to engage in a particular activity or to effect a particular outcome” (p. 263). Within SCCT, researchers distinguish between two types of goals—choice and performance goals. Choice goals are described as one's intention to pursue a particular activity (e.g., undergraduate students who choose to pursue teacher certification). Performance goals, on the other hand, reflect an individual's aspirations to attain a certain level of performance (Brown & Lent, 2006). The goals that teachers establish rely on self-efficacy beliefs and outcome expectations. Teachers are less likely to establish goals in fields or areas where they feel least efficacious or expect undesirable outcomes (Brown & Lent, 2006; Schwarzer & Hallum, 2008). The realization of these goals helps to strengthen and confirm self-efficacy beliefs and outcome expectations (Brown & Lent, 2006; Lent et al., 1994).

Within a SCCT framework, researchers have postulated three models to explain career-related interests, choice, and performance. Each model describes how various social cognitive variables guide career development (for a detailed discussion of these models see Lent et al., 1994). For this discussion, we briefly focus on the *Choice Model* and the *Performance Model*, while highlighting the role of self-efficacy.

SCCT's Choice Model. As described in Lent et al. (1994), the choice model depicts a process by which an individual's career-related goals influence his or her decisions to pursue a particular career path. In particular, influenced by occupation-related beliefs (i.e., self-efficacy and outcome expectations) occupational interests develop, leading to occupational choice goals (Brown & Lent, 2006; Lent et al., 1994). These choice goals, in turn motivate behaviors that will help individuals achieve their career-related goals. For example, a prospective teacher has high teaching self-efficacy and believes in the outcomes associated with being a teacher. Consequently, these beliefs influence his or her interest in the teaching profession, which

then translate into the career-related goal of becoming a teacher. With the goal and the intentions of becoming a teacher, the prospective teacher will likely enroll in a traditional or alternative teacher preparation program and engage in the appropriate actions that will help him or her achieve the goal.

The choice model can also be used to explain how career-related goals can change as a result of positive or negative experiences related to pursuing a particular career (Lent et al., 1994). For example, after declaring an elementary education major, the prospective teacher may be required to engage in a wide variety of experiences in the classroom and in the field. When reflecting on these experiences, the prospective teacher may realize the complexity of teaching math in an urban school. Should these experiences decrease self-efficacy beliefs or promote undesirable outcome expectancies, preservice teachers may modify their career-related goals (e.g., preference for teaching in a suburban school rather than an urban school, goal of becoming a math teacher) or worse, alter their choice of occupation.

SCCT's: Performance Model. The SCCT Performance Model is used to explain and predict an individual's level of success, performance quality, and the degree to which he or she persists in the face of obstacles during career-related pursuits (Brown & Lent, 2006; Lent et al., 1994). According to this model, occupational performance is influenced by an individual's ability, self-efficacy, outcome expectations, and performance goals (Lent et al., 2002). As one would expect, an individual's ability to engage in career-related behaviors will be predictive of his or her level of performance. However, ability also influences performance indirectly through its relationship with self-efficacy and outcome expectations. These career-related beliefs, in turn, affect the type of performance goals that people set for themselves, which influences persistence in the face of performance setbacks (Brown & Lent, 2006). The last feature of this model contains a performance feedback loop. Consistent with social cognitive theory, this performance feedback loop influences future self-efficacy appraisals, outcome expectations, and goals.

Given the important role of self-efficacy in this model, Lent and his colleagues (1994) stress the importance of individuals making accurate self-efficacy appraisals. Social cognitive theorists have noted the negative effects of underestimating one's self-efficacy, which include setting lower performance goals, avoiding challenges, and giving up more easily (e.g., Bouffard, Boisvert, & Vezeau, 2002). Drastically overestimating one's self-efficacy beliefs might result in an individual setting unrealistic goals and attempting tasks that are beyond his or her potential which may increase the likelihood of failure (Bandura, 1997; Lent et al., 2002). Inaccurate self-efficacy judgments relative to one's documented ability can alter an individual's career path due to the performance feedback loop that was discussed previously. For example, a novice teacher who grossly overestimates his or her self-efficacy might establish ambitious and challenging goals and attempt to engage in behaviors well beyond his or her ability. In situations where his or her performance is not consistent with what was envisioned, the novice teacher's self-efficacy beliefs might decrease, as may his or her willingness to persist when challenges occur in the future. SCCT researchers believe that slightly optimistic self-efficacy beliefs are beneficial to engagement and motivation; however, grossly overestimated self-efficacy beliefs can be detrimental to task performance and future motivation (Brown & Lent, 2006; Lent et al., 1994, 2002).

Implications for Teacher Education and Development

We believe that SCCT can be used to explain the aforementioned problems associated with the recruitment and retention of highly qualified teachers. As SCCT suggests, self-efficacy beliefs influence a person's career-related interests, goals, intentions, and performance (Lent et al., 1994). In light of this relationship, we discuss the implications in the context of teacher education. Many of the suggestions provided might pertain to both preservice and inservice teachers.

Do not assume that high self-efficacy beliefs are always beneficial and that self-efficacy doubts are problematic. Among many teacher self-efficacy researchers the assumption is that high self-efficacy beliefs are desirable and that self-efficacy doubts are problematic (Wheatley, 2002). This tendency to view high self-efficacy beliefs in this way may be attributed in large part to Bandura's early writings describing the benefits of self-efficacy beliefs. For example, in his 1977 article, Bandura suggests that high self-efficacy beliefs will influence "how much effort people will expend and how long they will persist in the face of obstacles and aversive experiences" (p. 194). Consequently, other teacher self-efficacy researchers (including the first author, see Siwatu, 2007) have described high self-efficacy beliefs as ideal. For example, Ross and Bruce (2007) stated: "Those scoring higher on teacher-efficacy measures are more likely to try new teaching ideas, particularly techniques that are difficult. High-efficacy teachers are more successful than are low-efficacy teachers because they attend more closely to the needs of lower ability students" (p. 50–51).

Wheatley (2002) presented a different perspective. He contended that high self-efficacy beliefs are not always beneficial and that self-efficacy doubts are not always problematic. Although Wheatley supported his argument with several research-based examples, in keeping with the context of this chapter we draw from two examples related specifically to career development. First, according to Wheatley, self-efficacy doubts can motivate teachers to learn and improve their teaching skills, in an attempt to remain (or become) an effective teacher. An elementary teacher, for example, who is aware of (and values) the need to use alternative approaches to teach African American students and has culturally responsive teaching self-efficacy doubts may be motivated to develop the knowledge and skills associated with culturally responsive pedagogy. The development of these new skills may in return prevent burnout and increase job satisfaction. A related example provided by Wheatley suggested that teachers who have a false sense of their capabilities might actually be prone to professional burnout. He stated,

Teacher efficacy doubts may aid reform by helping prevent teacher burnout. McDonald (1991) concluded that with growing experience and skill, teachers sometimes develop a false sense of certainty that sets them up for disillusionment and burnout. The teacher may blame the students or whomever for their struggles, when the real problem was overconfidence, that is, too-positive efficacy. This perspective contrasts with the usual assumption that it is teachers' efficacy doubts that are a key culprit in teacher burnout and attrition. (p. 12)

Wheatley's convincing argument may prompt teacher self-efficacy researchers to rethink the assumed need to focus on raising teachers' self-efficacy beliefs. We believe that the focus should be on helping teachers make informed and accurate self-efficacy appraisals, while also focusing on the nature of their self-efficacy doubts.

Assist teachers in making realistic self-efficacy appraisals. Using SCCT as a framework leads us to believe that prospective teachers may choose not to pursue a teaching career on the basis of their self-efficacy appraisals. On the other hand, novice teachers who enter the profession with unrealistic optimism may have self-efficacy shattering experiences that result in a premature departure from the teaching profession. As described in these two examples, teachers' self-efficacy beliefs may influence their career-decision making, and thus it is important that they make realistic self-efficacy appraisals. Unfortunately, research findings suggest that teachers have the tendency to overestimate and underestimate their self-efficacy beliefs (e.g., Settlage, Southerland, Smith, & Ceglie, 2009).

One factor that contributes to inaccurate self-efficacy appraisals is faulty metacognitive knowledge (Bandura, 1997; Schunk & Pajares, 2009; Usher & Pajares, 2008). According to Flavell (1979), metacognitive knowledge consists of an individual's knowledge of themselves (and others), the task, and available strategies. Making a self-efficacy appraisal requires the individual to draw from what they know about themselves and others, the task, and the available strategies to execute the task successfully (Knoblauch & Woolfolk Hoy, 2008). Optimistic self-efficacy beliefs, for example, may indicate that an individual is underestimating the difficulty of a teaching task (e.g., culturally responsive classroom management) whereas self-efficacy doubts may stem from a teacher's belief that all novice teachers struggle with a particular teaching task (e.g., managing a classroom in an urban school), which influences his or her own self-efficacy appraisals.

When lacking knowledge about a task and its requirements, teachers may attempt to make an informed self-efficacy appraisal by drawing inferences using similar and related tasks. Drawing upon these types of inferences might lead a teacher to naively overestimate or underestimate his or her abilities. Therefore, to assist teachers in making realistic appraisals, teacher educators should design learning experiences that will promote teachers' metacognitive knowledge and awareness of task demands, while focusing on the development of related strategies that are necessary to complete the teaching task successfully (Butler & Cartier, 2004). This can be accomplished in part through strategy instruction supplemented with ongoing, informative feedback.

Explore teachers' self-efficacy doubts. Teacher educators should frequently assess teachers' self-efficacy beliefs in order to identify the types of task that they feel most and least efficacious to successfully complete. However, teacher educators should exercise caution when interpreting teachers' self-efficacy appraisals. According to Wheatley (2005), when reading and responding to items on a self-efficacy measure teachers do so with (or some combination of) an agent-ends, agent-means, or means-end perspective. For example, if asked, "how confident are you in your ability to address inappropriate behavior without relying on traditional methods of discipline," self-efficacy appraisals may vary depending on the perspective taken. A teacher with lower self-efficacy appraisals may respond in such a way due to the belief that (1) he or she can accomplish the task successfully,

but doubts whether doing so would successfully modify a student's behavior (agent-ends beliefs), (2) he or she simply cannot accomplish the task successfully (agent-means beliefs) and (3) addressing inappropriate behavior without relying on traditional methods of discipline simply does not work (means-end beliefs). If it is the teacher educator's goal of designing an intervention or an activity to increase teachers' self-efficacy beliefs, then understanding the exact reason for the doubt should be the focus. The nature of the intervention (i.e., self-efficacy building activity) would therefore depend on the reasons behind the low self-efficacy appraisal (Wyatt, 2012). For example, if a preservice teacher's self-efficacy doubts stem from means-ends beliefs, then it may be most helpful for the teacher educator to provide the preservice teacher with concrete evidence that engaging in the task will result in positive student outcomes.

Incorporate the factors known to influence self-efficacy belief formation in teacher education and professional development activities. Teacher self-efficacy researchers have cautioned that teacher preparation and professional development efforts that focus only on developing high quality teaching skills may not predict whether the teachers will utilize these newly acquired skills in the classroom (Chong & Kong, 2012; Siwatu, 2007; Zeldin & Pajares, 2000). According to Bandura (1997), "perceived self-efficacy is concerned not with the number of skills you have, but with what you believe you can do with what you have under a variety of circumstances" (p. 37). Therefore, preparation efforts and professional development activities should be designed to increase teachers' self-efficacy beliefs to implement various instructional tasks in their classrooms.

Efforts to nurture resilient self-efficacy beliefs should incorporate the factors believed to influence the formation of these beliefs (Siwatu, 2009, 2011; Ross & Bruce, 2007). These factors include mastery and vicarious experiences, messages from others, and physiological and emotional reactions (Bandura, 1997). The first source is mastery experience which reflects opportunities to perform the specified task(s). A second source of self-efficacy is vicarious experience and involves the opportunity to observe live or symbolic models. Bandura believed that people make self-efficacy appraisals based on information they receive from others. Positive messages from others, a third source of self-efficacy information, may potentially strengthen self-efficacy beliefs whereas messages that convey inability may weaken self-efficacy beliefs. The final source of self-efficacy is information conveyed by an individual's physiological (e.g., increased heart rate, sweaty palms, and so forth) and emotional reactions (e.g., anxiety, staying calm, and so forth).

Of these four sources, mastery experiences are believed to be the most influential because they provide an individual with firsthand experience regarding their capabilities (Bandura, 1997). However, for preservice teachers who do not have a lot of mastery experiences to draw from, the other known sources of self-efficacy information have a greater impact. As teachers gain more firsthand experience, they are less likely to consider the other three sources when making self-efficacy appraisals (Tschannen-Moran & Woolfolk Hoy, 2007). Efforts to incorporate self-efficacy building components into teacher education and professional development activities should consider which of the four sources of self-efficacy information is most influential to preservice and inservice teachers, respectively. Bandura (1997) cautioned, however, that the effectiveness of these experiences are influenced by how

individuals cognitively processes and interpret them. In the sections that follow, we address two factors that may influence how self-efficacy information is cognitively processed—causal attributions and personality factors.

Attend to the cognitive processes through which teachers interpret their performance. In his earlier writings, Bandura (1986) described the reciprocal relationship between self-efficacy and attributions. Attributions are the rationalizations and justifications an individual makes to explain the causes of success or failures (Weiner, 1986). According to Bandura (1986), self-efficacy beliefs can be influenced by how an individual explains the causes of an outcome or event. Additionally, the types of attributions that an individual makes may be influenced by his or her self-efficacy beliefs. For example, a person with low self-efficacy may attribute his or her failures to low ability, whereas an individual who is highly efficacious may attribute failure to effort. According to Weiner (1986), the nature of an individual's attributional patterns has behavioral and emotional consequences. For example, novice teachers who consistently attribute their inability to bring about positive student learning outcomes to external uncontrollable factors (e.g., students' ability, students' family structure, school climate) may decide to leave the profession within the first five years of service. The decision to leave the profession may result when the novice teacher does not see himself or herself instrumental in determining or influencing student-learning outcomes.

Unfortunately, as research suggests, individuals have the tendency to make erroneous, biased, and potentially harmful attributions (Pintrich & Schunk, 2002). These types of attributions may in turn influence self-efficacy beliefs. Since individuals have the propensity to make biased attributions, researchers have examined ways to change their maladaptive attributional patterns. This process is referred to as attributional retraining (Schunk, 1989). Grounded in Weiner's (1986) attribution theory, attribution retraining is a cognitive intervention designed to change maladaptive attributions to more adaptive ones. Attribution retraining programs are designed to encourage an individual to attribute events and outcomes to controllable causes (e.g., effort, strategy selection).

Despite the widespread applications of attribution retraining interventions in K-12 and higher education, its use has not been explored within the context of teacher education. Within the context of teacher education, attribution retraining may be a viable intervention for experienced teachers whose attributions have become maladaptive and stable overtime. In addition, beginning teachers may also benefit from participating in an attribution retraining program. For novice teachers, it may be helpful to assist them in making adaptive attributions before they get into the habit of making maladaptive attributions. For this reason, it may be more appropriate to categorize this type of intervention as attribution training rather than retraining. The purpose of an attribution retraining or training program is to assist novice and experienced teachers in developing the analytical and cognitive skills to make adaptive causal attributions. The training program should emphasize the importance of attributing classroom outcomes and events to controllable causes (e.g., a non-culturally responsive approach to teaching, instructional design); train novice teachers to interpret failure and undesirable classroom outcomes as a natural stage in a teacher's development; and remind novice teachers to accept responsibility for desirable classroom outcomes (Fulk & Mastropieri, 1990).

Attend to teachers' personality traits that may influence how mastery experiences are interpreted. Psychological researchers have found that personality traits may predispose individuals to interpret events in particular ways (Ripski, LoCasale-Crouch, & Decker, 2011). Consequently, this area of research has caught the attention of researchers who are interested in understanding the relationship between teachers' personality characteristics, self-efficacy beliefs, and job-related outcomes such as professional burnout (Cano-Garcia, Padilla-Munoz, & Carrasco-Ortiz, 2005; Jamil, Downer, & Pianta, 2012).

Jamil et al. (2012) believe that two of the personality traits—extraversion and neuroticism—contained in the five-factor model of personality (Costa & McCrae, 1992) may be of interest to teacher self-efficacy researchers. An extraverted person is characterized as having a very positive outlook, experiences positive emotions, and is less likely to experience anxiety over negative feedback. An individual with a neurotic personality trait is characterized as being pessimistic and anxious and having the tendency to experience helplessness (Costa & McCrae, 1992; Ripski et al., 2005). These two personality traits influence how teachers perceive and interpret classroom events (Kokkinos, 2007; Ripski et al., 2005). Consequently, these personality traits can potentially influence teachers' self-efficacy beliefs. Jamil and her colleagues (2012) tested their hypothesis that personality traits would predict preservice teachers' self-efficacy beliefs. Consistent with theory and their expectations, the researchers found that extraversion and neuroticism levels were significant predictors of teaching self-efficacy beliefs. In particular, they found that preservice teachers with higher levels of extraversion were more confident in their teaching abilities, whereas those with higher levels of neuroticism had an abundance of teacher self-efficacy doubts.

Jamil et al.'s (2012) findings are important given the research that documents the relationship between high levels of neuroticism and teacher burnout (Cano-Garcia et al., 2005). Consequently, the influence of personality traits on teachers' self-efficacy beliefs and career decision-making should not be overlooked. To assist teachers overcome their neurotic tendencies we offer three suggestions. First, when provided with opportunities to implement their newly developed skills, teachers with neurotic characteristics should not have to interpret their performance and the subsequent outcomes by themselves. Instead, they should be given opportunities to debrief with a mentor teacher. Doing so might assist the teacher in thinking about their performance in more constructive and realistic ways. Second, to prevent neurotic teachers from developing a sense of hopelessness following mediocre performance, they should be provided with constructive feedback that focuses on aspects of their teaching behavior that can be modified. Third, SCCT suggests that individuals might eliminate teaching as a possibility (or leave prematurely) if they perceive that the presence of barriers and challenges will prevent them from being successful (see Brown & Lent, 2006). Teachers with neurotic personality traits might respond to these perceived barriers with pessimism, which in turn might foster self-efficacy doubts (Jamil et al., 2012). SCCT researchers recommend assisting individuals (i.e., teachers) in identifying how to respond to perceived barriers and teaching them strategies to overcome them.

Build “teaching” experiences into coursework. During the course of their preparation, preservice teachers should be given opportunities to develop and fine-tune their teaching skills. Rather than rely solely on students' field experiences as the

vehicle in which to practice, we recommend that teacher educators build “teaching” experiences into their coursework. One such training concept that provides preservice teachers with these opportunities is called microteaching (Allen & Eve, 1968; Cruickshank & Metcalf, 1993). According to Cruickshank and Metcalf (1993), microteaching is a “scaled-down teaching encounter in which pre-service teachers demonstrate their ability to perform one of several desirable teacher abilities to a group of 3–5 peers during a short time period” (p. 87). Two key components of microteaching are videotaped lessons and feedback (Amobi, 2005; Benton-Kupper, 2001). As Amobi (2005) explained, preservice teachers develop a micro lesson and then teach the lesson to his or her peers. With an instructor and a group of his or her peers, the preservice teacher reviews the videotaped lesson. Immediately afterwards, the small group discusses the presentation at which point they highlight some of the strengths and weaknesses of the lesson. This small group activity provides students with mastery experiences (i.e., delivery the lesson), vicarious experiences (i.e., viewing the teaching demonstration of others), and verbal persuasion (i.e., opportunity to receive performance feedback), all of which are instrumental in the development of self-efficacy (Bandura, 1997).

Provide novice teachers with supported induction experiences. During the first year of teaching, novice teachers may encounter unforeseen challenges and obstacles that may shatter their once unrealistic optimism. These first-year reality shocks may cause novice teachers to doubt their capabilities and in turn may influence their decision to leave the field (Woolfolk Hoy & Spero, 2005). Therefore, it is important to provide beginning teachers with the emotional and psychological support needed to prevent a drastic decline in their self-efficacy beliefs and job satisfaction (Hobson, Ashby, Malderez, & Tomlinson, 2009). The act of pairing novice teachers with mentor teachers is one mechanism that can provide this much needed support and raise retention rates (Berry, 2004).

According to Gay (1995), it is important to pair novice teachers with mentor teachers who have an established record of success. This is important for several reasons. First, research indicates that observers are more likely to imitate a model’s behavior if they perceive the model to be competent (Van Gog & Rummel, 2010). Therefore, novice teachers would be more likely to imitate the mentor’s pedagogical approaches if the mentor has an established record of success. Second, research that has examined the effect of modeling on self-efficacy suggests that the effectiveness of the model is influenced by an individual’s perceptions of the model’s competence and level of expertise (Labone, 2004). Third, the effectiveness of emotional and psychological support needed to nurture novice teachers’ self-efficacy beliefs depends on novice teachers’ perception of the credibility and expertise of the mentor (Bandura, 1997). For example, when executing a new skill or task, individuals often rely on the feedback that they receive from others (e.g., cooperating teachers, teacher educators, school administrators, colleagues). When this feedback is constructive and comes from a more competent other, it can sustain or increase existing self-efficacy beliefs.

Carefully structure preservice teachers’ clinical experiences. In a study of seven successful teacher education programs, Darling-Hammond (2006) noted that each program carefully structured and managed preservice teachers’ clinical experiences. For many of these programs, preparing preservice teachers for the

field of teaching entailed a series of clinical experiences preceding student teaching. These experiences were staggered so that there was a gradual increase in the length of the experience, amount of responsibility, and degree of complexity inherent in each clinical experience. With a developmental trajectory in mind, preservice teachers' clinical experiences might include moving from classroom observations to working with students one-on-one to co-planning and teaching with a cooperating teacher and culminating with teaching one or more lessons independently. When this staggered approach to structuring clinical experiences includes in-depth experiences working in real-world settings, it may provide prospective teachers with the basis (e.g., understanding task demands) for making informed self-efficacy appraisals.

Support teachers' attempts to implement new instructional strategies related to reform initiatives. The primary purpose of professional development for teachers is to assist them in developing the knowledge and skills to be more effective teachers (Posnanski, 2002). While some teachers may feel confident in their abilities to successfully implement newly developed skills, research findings suggest teachers often experience self-efficacy doubts after initial attempts to apply these skills in their classroom (Tschannen-Moran & Johnson, 2011). This trend is known as the "implementation dip" (Woolfolk Hoy & Spero, 2005). The emergence of self-efficacy doubts are likely if the professional development activities were focused on developing teachers' pedagogical knowledge and skills, while neglecting to identify, develop, and evaluate teachers' implementation self-efficacy beliefs (Posnanski, 2002). Research suggests that the "implementation dip" can be avoided if teachers are provided with additional support, such as follow-up coaching (Tschannen-Moran & McMaster, 2009). Tschannen-Moran and McMaster (2009) found that compared to other professional development formats, providing teachers with opportunities to observe a model, practice the new skills in their own classrooms, and receive follow-up coaching had the strongest effect on self-efficacy beliefs and implementation. Since teachers' self-efficacy beliefs play an important role in whether new teaching skills are implemented, it is important to provide teachers with the necessary support during the early stages of implementation.

RECOMMENDATIONS FOR FUTURE RESEARCH

In this chapter, we have examined the relevance of teachers' self-efficacy beliefs from a SCCT framework. To better understand the role of teachers' self-efficacy beliefs in career decision-making, we believe that more evidence-based, teacher self-efficacy intervention research is warranted. In addition, we believe that the field of teacher self-efficacy research in general can benefit from more studies that truly integrate quantitative and qualitative methods into a single study (i.e., mixed methods research).

Within the field of education, there is a push for teacher educators and educational practitioners to base their practice on the most rigorous evidence available (Slavin, 2002). Along similar lines, we contend that attempts to develop teachers' self-efficacy beliefs should also be based on rigorous evidence. This evidence should inform consumers and producers of teacher self-efficacy research about what will and will not work regarding self-efficacy belief modification.

In recent years, teacher self-efficacy research has witnessed an overwhelming presence of correlational studies (Henson, 2002; Klassen et al., 2011). In an investigation looking at published teacher self-efficacy research, Klassen and his colleagues (2011) found that within the last 12 years, approximately 77% of studies on teacher self-efficacy were strictly quantitative and 63% of these were correlational. While any of the data collected through these methods of inquiry can be used as evidence (Levant & Hasan, 2008), some research findings offer more “valuable” evidence than others. For example, suppose we were to design a study to answer the following research question: Will Intervention X have a greater effect on teachers’ self-efficacy beliefs compared to Intervention Y? A correlational design and analysis would not be able to furnish data that would help us to make any causal inferences. Consequently, a well-designed experiment is required (Slavin, 2002). This is not to say that other research methods and designs do not play a role in the process of examining the effectiveness of teacher self-efficacy interventions. Qualitative research methods and correlational designs can be useful in identifying key variables to include in an experiment.

We suggest that instead of correlational and cross-sectional studies, focus should be placed on designing longitudinal experiments to observe the influence that the intervention has on teachers’ self-efficacy beliefs and career decision-making. In order to learn more about the long-term development of teacher self-efficacy, longitudinal studies allow researchers to observe how teachers’ self-efficacy beliefs development over time. Klassen and colleagues (2011) suggest that more experimental and longitudinal studies are needed to determine if the interventions are actually working as hypothesized and how they function over time. Where longitudinal studies fall short, qualitative data collection can help to explain drops, rises, and plateaus visible in quantitative data giving a venue to better understand how teacher efficacy develops. Integrating quantitative and qualitative methods in a single study can provide stronger empirical evidence, which researchers use to make better inferences regarding the effectiveness of a teacher self-efficacy intervention. Integrating quantitative and qualitative methods in this way is referred to as mixed methods research.

Twenty years ago when teacher self-efficacy research began to flourish and gain popularity, mixed methods research emerged as a third research paradigm in the social and behavioral sciences (Teddlie & Tashakkori, 2009). Tashakkori and Creswell (2007) defined mixed methods research as “research in which the investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or program of inquiry” (p. 4).

The recent teacher self-efficacy reviews by Klassen et al. (2011) and Wyatt (2012) highlight the value of mixed methods research. Mixed methods research may appeal to teacher self-efficacy researchers who want to: (1) mix quantitative and qualitative research methods to either develop a more complete understanding of the research problem or who want to corroborate one data set with the other; (2) use qualitative data to assist in the interpretation of the quantitative results; (3) extend the generalizability of the findings of a qualitative study or use the qualitative findings to develop a quantitative instrument; or (4) embed qualitative research methods to help inform the development of an experimental intervention, develop a complete

understanding of the process and outcomes of an experimental intervention, and/or explain the results of an experimental intervention.

We caution teacher self-efficacy researchers, however, from collecting quantitative and qualitative data without carefully considering how they will be integrated. Simply adding an open-ended question to a quantitative questionnaire, for example, does not automatically constitute a mixed methods study (see Creswell & Plano Clark, 2011; Teddlie & Tashakkori, 2009). Teacher self-efficacy researchers can select from existing mixed methods designs or develop a design that is best suited to addresses a particular research problem. We agree with Creswell and Plano Clark's (2011) suggestion that those new to mixed methods research should consider using preexistent mixed methods designs. For more information about these designs and others, researchers are encouraged to refer to Creswell and Plano Clark (2011) and Teddlie and Tashakkori (2009).

SUMMARY

As previously indicated, many researchers have attempted to highlight the importance of teacher self-efficacy research by citing the link between a teacher's self-efficacy beliefs and student outcomes such as academic achievement and student motivation. Current reviews of teacher self-efficacy research suggest that there is modest empirical support for this hypothesized relationship. If the relevance of the teacher self-efficacy construct was developed on a premise that is modestly supported by empirical research, it begged the questions, why are a teacher's self-efficacy beliefs important and what is the value of knowing nature of these beliefs? As we pondered the answer to this question, we were reminded of Bandura's early writings and the research documenting the relationship between teacher self-efficacy beliefs and job-related outcomes such as burnout (e.g., Fives, Hamman, & Olivarez, 2007; Skaalvik & Skaalvik, 2010) and job satisfaction (e.g., Klassen & Chiu, 2010; Lent, Nota, Soresi, Ginerva, Duffy, & Brown, 2011). This influenced our decision to examine the important role of teachers' self-efficacy beliefs from the perspective of SCCT. We believe that SCCT could help us understand why it is difficult to recruit highly qualified individuals into the teaching profession and why it is difficult to retain those that choose the teaching profession (Ingersoll & Smith, 2003).

SCCT suggests that there are many events that might influence a person's career-related interests, goals, intentions, and performance (Lent et al., 1994). With the ultimate goal of retaining highly qualified teachers, we believe that teacher educators play an important role. During the course of preparation, preservice teachers are constantly evaluating their decision to pursue a career in teaching. As previously discussed, preservice teachers' self-efficacy beliefs can influence their decision to continue their pursuit of a teaching career. Therefore, teacher educators play a very instrumental role in shaping the career trajectory of preservice teachers. Teacher educators should structure learning opportunities that are responsive to preservice teachers' self-efficacy doubts and that will assist them in developing realistic self-efficacy appraisals. Upon entering the profession, school administrators should provide teachers with mentoring and carefully structured induction experiences, and support their attempts to implement instructional strategies. Following in the

framework of social cognitive theory, these experiences help teachers develop accurate self-efficacy beliefs and positive outcome expectations.

NOTE

- 1 In context of this chapter, we will use the term *teacher* to refer to both preservice and inservice teachers. When necessary, we refer to each group accordingly.

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13

A “HOT” MESS

Unpacking the Relation Between Teachers’ Beliefs and Emotions

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Well-targeted and well-deployed emotion seems to be a support system without which the edifice of reason cannot operate properly.

(Damasio, 1999, p. 42)

Over two decades ago, Pajares (2002) declared teachers’ beliefs a “messy” construct, and in that time, numerous researchers have attended to his call to try and clarify this important construct in the teacher research literature (for a review, see Fives & Buehl, 2012; Woolfolk Hoy, Davis, & Pape, 2006). Recently, as the trend in cognitive science has moved to increasingly acknowledge the role of affect and emotions on cognition—known as “hot” cognition (Thagard, 1989)—education researchers have begun to examine the influence of affect on learning, including on conceptual change (Gregoire, 2003; Sinatra, 2005), teaching (Schutz, Aultman, & Williams-Johnson, 2009; Schutz, Cross, Hong, & Osbon, 2007), learning (Pekrun, Goetz, Titz, & Perry, 2002), and subject areas (Linnenbrink & Pintrich, 2004; Zan, Brown, Evans, & Hannula, 2006). Few, however, have examined how teachers’ beliefs and affect influence each other. Affect and emotions play a critical role in motivating change in beliefs (Ashton & Gregoire-Gill, 2003, p. 99); however, scant research exists on the relationship between teachers’ beliefs and emotions. Only 15 out of 848 pages in the influential *Handbook of Emotions* (Lewis, Haviland-Jones, & Barrett, 2008) reference beliefs; and none of them addressed teachers’ beliefs. The predominant thrust

of existing research and theory on teachers' beliefs remains coldly cognitive (Fives & Buehl, 2012), despite strong criticisms of such an overly rational approach (Gregoire, 2003). Given the importance of teachers' beliefs to the educative process and the important role of affect and emotions in this process, we thought it important to attempt to clarify the relation between teachers' beliefs and affect and their influence on educational practice.

The purpose of our chapter is multilayered: First, we hope to clarify the relation between affect and cognition based on the latest hot models of cognition coming out of cognitive psychology, social psychology, and neuroscience, and to discuss how this research may be applicable to a better understanding of the relationship between teachers' beliefs and emotions. Next, we use conceptual change theory, with regard to teachers' belief change, as a special instance to illustrate the relationship between beliefs and emotions, updating and clarifying hot models of belief change in the process. Third, we address the literature on teachers' beliefs about emotions to better understand the role of beliefs in shaping the emotional life of classrooms. Finally, we conclude with implications of this research for practice and directions for further research.

To conduct our review, we searched ERIC, Psych Info, and Google Scholar for the following search terms: beliefs, affect, teach*, emotions. Because the literature is sparse, we chose to focus on the literature that was available on these topics; this was primarily in the areas of conceptual change theory and in the teacher emotions literature. As the purpose of the chapter is not to provide a systematic overview of the literature on teachers' beliefs and affect, because the literature is too thin right now to provide this, we instead focused on representative articles that supported our tripartite goals of clarifying the relation of beliefs and affect with regard to teachers' beliefs, that addressed affective issues with regard to conceptual change, and that provided empirical evidence of the role of teachers' beliefs in shaping the emotional life of classrooms. Given the variable use of these terms, we turn next to definitions.

DEFINITIONS

For the purposes of this chapter, we have adopted the following definitions of these key terms. We acknowledge that these definitions are hotly contested, yet given our debt to social psychological appraisal theories in shaping our thinking, we have adopted this particular lens to frame our understanding of these key terms.

- *Affect*, or feelings, refer to “an embodied reaction of pleasure or displeasure signifying the goodness or badness of something” (Clare & Palmer, 2009, p. 21). Moods and emotions are different types of affect.
- *Moods* are general affective states of “feeling good” or “feeling bad” without any conscious cognitive cause (Forgas, 2000).
- *Emotions* are “*interpreted feelings*” (Ortony, Norman, & Revelle, 2005, p. 174); whereas feelings are undifferentiated affect (Ortony et al., 2005). Emotions are generally short in duration, usually have a clear cause, and are available to conscious awareness (Forgas, 2000).
- *Appraisals* are evaluations that help make sense of affect and thus transform feelings into emotions (Clare & Ortony, 2008).

- *Beliefs* are “states that link a person or group or object or concept with one or more attributes, and this is held by the believer to be true” (Clare & Palmer, 2009, p. 5), differentiating them from knowledge which has greater reliance on outside estimations of its truth value.
- *Cognitions* is a very general term used in social psychological literature to refer to “beliefs, attitudes, values, and feelings about oneself, others, or the environment” (Harmon-Jones, 2000, p. 185). We use cognitions to refer to beliefs, attitudes, thoughts, and knowledge, but not feelings, to help us focus our lens on the distinction between thoughts and feelings, beliefs and affect.

With these definitions in mind, we now attempt to clarify the relation between affect and cognition based on the latest hot models of cognition coming out of cognitive psychology, social psychology, and neuroscience, and to discuss how this research may be applicable to a better understanding of the relationship between teachers’ beliefs and emotions.

Teachers’ beliefs matter. They influence teachers’ behavior in the classroom and are influenced by teachers’ behavior (See Buehl & Beck, Chapter 5, this volume). They particularly seem to affect teachers’ justifications for their decision making, which influences their lesson planning (Gill & Hoffman, 2009; Speer, 2008). Yet, the predominant thrust of research and theory on teachers’ beliefs remains coldly cognitive (Fives & Buehl, 2012), despite strong criticisms of such an overly rational approach (Gregoire, 2003). Emotions matter too (Schutz & Pekrun, 2007)—particularly in the complex world of ill-structured problems and human interaction that comprise today’s classrooms. Emotions shape beliefs and are shaped by beliefs. They also play a critical role in belief change (Gregoire, 2003; Schutz & Pekrun, 2007). To ignore affective constructs such as emotions is to present an incomplete and even faulty understanding of teachers’ beliefs. There is not much research on the relation between beliefs and emotions in education, and even less with regard to teachers’ beliefs. Even considering the chapters in this volume, one might be left with the impression that beliefs are solely a cognitive construct. Other chapters have addressed motivational factors (see Watt & Richardson, Chapter 11, this volume; Siwatu & Chesnut, Chapter 12, this volume) and contextual factors related to beliefs (see Tschannen-Moran, Salloum, & Goddard, Chapter 17, this volume), yet these constructs are not “hot” enough to truly capture the often passionate nature of teaching and learning in today’s classrooms. Cutting-edge research on cognition reveals that cognition is “hot” in that it is intimately tied to affect and emotions (Clare & Palmer, 2009; Cunningham & Zelazo, 2007). Yet, most educational research has neglected to tie cognition to affect, and even when affect is included in research questions, it is often treated as distinct from cognition. For instance, Philipp (2007), in his seminal chapter on mathematics teachers’ beliefs and affect, stated that he was unable to integrate beliefs and affect, and thus he treated each separately.

RELATIONSHIP BETWEEN BELIEFS AND AFFECT

Before we can examine teachers’ beliefs specifically, it is necessary to examine more generally how beliefs and affect are related. Key psychologists interested in learning have historically addressed the importance of not dissociating emotion and

cognition. According to Piaget (1981), affect gives the energy; cognition provides the engine (for further elaboration, see Ashton & Gregoire-Gill, 2003). Similarly, Vygotsky (1986) claimed that “thought is not begotten by thought; it is engendered by motivation, i.e., by our desires and needs, our interests and emotions” (p. 252). Currently, cutting-edge theory is elegantly expressed by Schutz and his colleagues (2009) in that emotional experiences are defined as “person-environmental transactions” (p. 202), and beliefs serve as one of the “referent points” from which emotional experiences emerge (p. 201). We will return to complex models such as this one later. Next, we review three different ways in which beliefs and affect can be related: affect can influence beliefs, beliefs can influence affect, or beliefs and affect interact in complex, messy ways.

Affect Influences Beliefs

Initial theories about the relation between affect and beliefs held that emotions influence beliefs. This idea goes back to ancient Greece, as even Aristotle argued that emotions must be aroused in order for certain beliefs to form (Frijda & Mesquita, 2000). Specifically, “Emotions can awaken, intrude into, and shape beliefs, by creating them, amplifying or altering them, and by making them resistant to change” (Frijda & Mesquita, 2000, p. 5). Contemporary thinkers adopting this perspective are exemplified by Forgas (2000) in his Affect Infusion Model (AIM), in which affect is postulated to “infuse” cognitive processes (p. 117); specifically, in this model, affect influences cognition and colors the outcome of such processes (Forgas, p. 110). Forgas (2000) reported evidence in support of AIM in a series of studies with his colleagues. In one study, participants were induced into a happy or sad mood and then asked to watch videotapes of their past social interactions (Forgas, Bower, & Krantz, 1984, as cited in Forgas, 2000). Results showed that moods biased cognitive interpretations of the interactions in the expected direction, such that positive moods resulted in more positive beliefs and interpretations of the interactions, with the opposite occurring for negative moods. In another study, they found that moods influenced beliefs and judgments concerning complicated social interactions (Forgas, Bower, & Moylan, 1990, as cited in Forgas, 2000). Facing identical outcomes, those participants in a negative mood were more likely to be self-critical than those in a positive mood; the latter were more likely to be lenient with themselves, such that their moods influenced their self-beliefs. Beyond mood effects on judgments and beliefs, emotion has been postulated to influence the storage and recall of beliefs in long-term memory (Nespor, 1987). Emotions have also been found to influence political beliefs (Frijda & Mesquita, 2000), attention (Clore & Gaspar, 2000), decision making (Isen, 2008), and goals (Clore & Gaspar, 2000).

Beliefs Influence Affect

For centuries, people have held on to the idea that emotions influence beliefs. However, advances in cognitive models of emotion now hold that beliefs influence emotion (Lazarus, 1994). Most current theories on the relation between beliefs and affect are grounded in appraisal theory, which holds that beliefs influence the appraisals one makes, which, in turn, influence emotions (e.g., Clore & Ortony, 2008;

Ellsworth & Scherer, 2003). Moors (2010) posited that appraisals are automatic, and as such, influence one's affective responses. To illustrate her claim, she provided an example of meeting a bear in the woods. This situation is only frightening if one appraises that one's life is threatened. Should the bear be behind a protective glass, as found at some modern zoos that imitate natural habitats, then the situation would be appraised differently, likely giving rise to positive affect. There is a plethora of debate in the social psychology community about whether appraisals are automatic and unconscious; and if so, do they count as cognitive processes (Ellsworth & Scherer, 2003; Gratch, Marsella, & Petta, 2009; Marinier III, Laird, & Lewis, 2009; Marsella & Gratch, 2009)? The underlying consensus seems to be that appraisals are often automatic evaluations that help make sense of affect, and thus transform feelings into emotions (Clore & Ortony, 2008). This definition helps clarify the cognitive influence on emotions, while allowing for feelings or general affect to occur at a more immediate, unconscious level of influence. Appraisals often reflect implicit beliefs, such as beliefs about one's coping potential, beliefs about the event's goal significance, beliefs about the legitimacy of the situation, etc. (Ellsworth & Scherer, 2003). Thus, tacit beliefs provide the framework within which appraisals occur, which cause one to interpret a situation in a particular way, which leads to an emotional response. Of course, this process is hypothesized to occur almost instantaneously (Clore & Ortony, 2008). In education, these ideas are echoed by researchers such as Pekrun and his colleagues who claim that control and value beliefs precede emotions (Pekrun, Frenzel, Goetz, & Perry, 2007).

Complex Interactive Relations Between Beliefs and Affect

There are a few researchers who reflect a more complex view of the relation between affect and beliefs. Some current models of cognition, based in neuroscience and cognitive science as well as social psychology, hold that beliefs and emotions, though distinct conceptually, are nevertheless completely intertwined (Cunningham & Zelazo, 2007; Damasio, 1994). Goldin (2002) proposed an interesting theory related to mathematics beliefs that advanced upon prior thinking about the role of affect and beliefs, and he opened the door to more multifaceted ways of understanding the relationship between affect and beliefs. In his view, "affect stabilizes beliefs" (p. 69) in that positive feelings about one's beliefs entrenches those beliefs; yet beliefs "establish *meta-affective contexts* for the experience of emotion connected to the beliefs" (p. 69, emphasis in original). In other words, beliefs are paradigms through which situations are interpreted, leading to a recursive model where beliefs shape affect, which in turn instantiates beliefs. To apply Goldin's ideas to teachers' beliefs, consider the following two hypothetical mathematics teachers. Both experience initial sadness about a student who is failing pre-algebra and may not be able to take algebra courses in high school, affecting his chances of entering a good university. One teacher, however, has a strong belief that math ability is malleable and can be changed with effort and appropriate strategies, so she works with the student and his parents to come up with a plan to help remediate the student on some basic math skills that he lacks. This leads to success causing positive emotions that affirm the existing beliefs. The other teacher, however, believes that ability is fixed, and some students just cannot "get" higher math concepts, so she does not do anything out the

ordinary to help the student, who ends up failing the class. In both cases, teachers' beliefs created a meta-affective context, so that for the first teacher, sadness turned into hope, and for the second, sadness turned into apathy. These subsequent emotions then reinforce their respective ability beliefs.

Leading theorists of emotions are now embracing more complex, iterative perspectives on the back and forth relation between affect and cognitions, which include beliefs (Clare & Robinson, 2012; Marsella & Gratch, 2009). For the purposes of this chapter, cognitions and beliefs are used interchangeably in this section, since we have defined cognitions to include beliefs and knowledge which have historically been difficult to distinguish in the beliefs literature (Woolfolk Hoy, Davis, & Pape, 2006). Parkinson (2009), for example, proposed that emotions act as "situated adjustments to unfolding events" (p. 31). They are responsive to situational changes, and as such, are situated in events as they unfold, influencing those events and being influenced by them. In the fields of cognitive neuroscience, research on emotions is flourishing, based on findings like those reported by Damasio (1994): When cognitions are induced, magnetic response imaging (MRI) showed that emotions are also evoked. Cognitive and computer scientists are also starting to embrace the explanatory power of emotions in understanding human decision making. Some computer scientists are working on "unified computation models" (e.g., Marinier III et al., 2009; Marsella & Gratch, 2009), as opposed to dual process models, of cognition to create programming for more complex robots that can better emulate human decision making based on emotions and belief systems.

Ortony and his colleagues (2005) have proposed an elegant way to overcome the chicken/egg issue between emotions and cognitions. In their model, the authors proposed three levels of information processing: the reactive, the routine, and the reflective. The *reactive level* controls approach/avoidance behaviors and signals or interrupts higher levels. This level contains simple affect, which they call "proto-affect" (p. 175). Proto-affect evaluates the positive and negative valence of a situation. The *routine level* controls automatic processes and contains only primitive emotions (happiness, distress, excitement, and fear). Implicit expectations play a large role here, which is why we (the authors) believe that defying expectations can lead to more systematic, reflective thinking, in that it interrupts routine processing. General models or paradigms govern at this level. The *reflective level* is the "locus of higher-level cognitive processes and consciousness" (p. 177). The authors postulated that greater motivation exists at this level, and the emotions at this level are the conscious ones studied by appraisal theorists.

One of the more interesting aspects of the model proposed by Ortony et al. (2005) is that they use the model to discuss how learning occurs at each of the levels, making their ideas valuable for those of us in the field of educational research. At the *reactive level*, learning happens through habituation and some classical conditioning; at the *routine level*, information is learned through operant conditioning, some classical conditioning, and case-based reasoning; and at the *reflective level*, information is learned through higher-order thinking, such as "conceptualization, analogical, metaphorical, and counterfactual reasoning" (Ortony et al., p. 176). This model presents a sophisticated response to the James-Lange theory of emotion—the claim that perception of an event is followed immediately by the body's physical responses to that event and then the emotions follow the behavioral response (Hauser, n.d.)—that

has shaped much of the discussion on the relation between beliefs and affect: “So, if one asks the question, ‘Which comes first, cognition or behavior?’ the answer has to be that it depends. When reactions are triggered from the reactive or routine level, behavior precedes; but when the triggering comes from the reflective level, cognition precedes” (Ortony et al., p. 189).

Ortony and his colleagues (2005) concluded by acknowledging that nature is not as distinct as their model: Cognition, affect, motivation, and behavior overlap and are more integrated than what they can depict, yet their model does capture some of the complexity of the relation between emotions and cognitions and sheds light on our discussion. Now that we have an overview of current views on the relation between beliefs and affect from fields outside of education, we next review one of the few areas in education where researchers are starting to make a concerted effort to go beyond “cold” cognition.

CONCEPTUAL CHANGE THEORIES AND TEACHERS’ BELIEFS

Next, we turn to conceptual change theory, with regard to teachers’ belief change, as a special instance to illustrate the relationship between beliefs and affect, updating and clarifying hot models of belief change in the process. Pintrich, Marx, and Boyle’s (1993) seminal article paved the way for affective issues to be studied with regard to conceptual change. Sinatra (2005) commented on this trend, noting that the Cognitive Affective Model of Conceptual Change (CAMCC; Gregoire, 2003) was one of the few models that specified how emotions influence conceptual change. The CAMCC reflects a more complex, interactive relationship between beliefs and affect, in line with the models discussed above. According to the CAMCC, teachers’ initial responses to a reform message result in either positive, negative, or neutral affect based on their underlying self-beliefs, which in turn leads to challenge, stress, or benign/positive appraisals. Appraisals interact with motivation to influence cognitive processing of the reform message and subsequent belief change. Unlike other models of conceptual change, the CAMCC is specifically aimed toward explaining teachers’ beliefs and belief change, as well as depicting how affect and appraisals influence the belief change process.

Many conceptual change theorists start with some initial affective event, such as doubt (Bendixen, 2002) or dissatisfaction (Posner, Strike, Hewson, & Gertzog, 1982) as motivators of conceptual or belief change; however, none prior to the CAMCC detailed the specific affective mechanisms involved in belief change. Further, the CAMCC stipulates that dissonance and doubt is not enough to engender belief change. Following Schlenker (1982), the dissonance must implicate the self-beliefs of the person receiving the dissonant message which ignites an affective/emotional response. Support for this aspect of the model, targeting the self-beliefs of teachers, was found in a study where, when presented with a reform message, teachers who interpreted the reform as a general school level reform did not experience emotion about the reform; however, those who interpreted the reforms as affecting their own classroom practice were more likely to have an affective response to the reform message (Schmidt & Datnow, 2005). This aspect of the CAMCC is often overlooked by those interested in conceptual change, even those who cite the model in their own research (Southerland & Sinatra, 2005; Zhou, Nocente, & Brouwer, 2008).

Hotter models of conceptual change, described here because they include emotion and affect as part of cognition and belief change, such as the CAMCC and the Cognitive Reconstruction of Knowledge Model (CRKM; Dole & Sinatra, 1998) have been grounded in dual-process models. Recall that dual process models portray dual routes of cognitive processing, one involving affective or heuristic processing, and the other more deliberate, systematic processing (Gregoire, 2003; Petty & Wegener, 1999; Smith & DeCoster, 2000). Central to hot models of conceptual change is the notion that a negative emotion, such as dissatisfaction, disequilibrium, or doubt, is necessary to motivate conceptual change. Positive affect is associated with more heuristic, general cognitive processing. Though some still hold this to be true (e.g., see Fiedler & Bless, 2000), more recent research has found that positive affect can also lead to deep processing, particularly flexible cognitive processing that includes both heuristic and systematic elements (Isen, 2008). As Clore and Palmer (2009) noted, positive affect tends to be relational, global, or category-focused, whereas negative affect leads to a narrower focus, such as on “item-level processing” (p. 29), creating a kind of tunnel vision. In the educational research literature, there is also evidence that positive affect increases motivation, critical thinking, and student achievement (Linnenbrink & Pintrich, 2004; Sinatra & Mason, 2008).

The CAMCC has found some support, particularly in its claim that teachers’ openness to changing deeply held beliefs can be facilitated by challenging their beliefs in a way that implicates their selves, and that without implicating such beliefs, substantive conceptual change is unlikely (Ebert & Crippen, 2010; Gill & Algina, 2006; Gill, Ashton, & Algina, 2004). For instance, Jan, a participant in Ebert and Crippen’s (2010) study, resisted changing her beliefs about inquiry because her initial appraisal of the reform message resulted in a benign-positive appraisal of the message: “After the summer institute, I’ve realized that I’ve been doing these things all along” (p. 380). This appraisal led Jan to make only superficial changes in her teaching practice. Conversely, in an experimental study of preservice and inservice teachers, challenging specific beliefs held by the participants in way that implicated their selves resulted in conceptual change, compared to an intervention that did not challenge their beliefs, but merely activated prior beliefs (Gill & Algina, 2006). Kelchtermans (2005) has also shown how important teachers’ self-beliefs and self-understanding are to their behavior in the classroom, including their motivation, task perception, and self-esteem, which provides further support for the role of self-implication in belief change and action. Further, Broughton and her colleagues (2012), in an interesting study on students’ emotional reactions to Pluto being reclassified from a planet to a lowly dwarf planet, found that emotions toward a controversial topic became more positive after instruction and predicted students’ belief change. Though not focused on teachers’ beliefs, their study showed that emotions are involved in the process of belief change.

DYNAMIC MODELS OF TEACHERS’ BELIEFS CHANGE

Although empirical support exists for dual-process models of belief change, such as the recent findings about the CAMCC (Ebert & Crippen, 2010), current research on emotions suggests that dual process models do not adequately reflect the complexity of the relationship between cognition and affect (e.g., Clore & Ortony, 2008;

Cunningham & Zelazo, 2007). As discussed previously, new thinking is emerging, particularly in the fields of social psychology and cognitive neuroscience, that is grounded in iterative models depicting the relationship between cognition and affect. Two theories stand out for addressing the recursive relationship between teachers' beliefs and emotions: a transactional model (Schutz, Cross, Hong, & Osbon, 2007) and the Integrated Model of Belief Change (Ashton & Gregoire-Gill, 2003).

The transactional model (Schutz, Cross, Hong, & Osbon, 2007) suggests that teachers' identities influence the beliefs they hold with regard to particular activity settings, which are influenced by their goals and cognitive appraisals, leading to particular emotional episodes, which in turn may confirm or challenge prior beliefs. Further, beliefs may be changed in the process, potentially influencing teachers' identity. The model by Schutz et al. is one of the first in educational research to show beliefs influencing behavior both before and after the emotion. They give an example of a teacher whose identity as an authoritarian teacher leads to the belief that she should remain emotionally distant from her students. When this teacher receives a letter from a student thanking her for her influence on the student's life, the teacher experiences joy, which in turn leads to belief change and a more compassionate teacher identity (Williams et al., as cited in Schutz et al., 2007). One of the limitations of the transactional model, however, is that emotion and cognition are discrete events in this model, and though the emotional cycle is recursive, the emotional event and beliefs are depicted as single events in time.

Next, the model proposed by Ashton and Gregoire-Gill (2003) was one of the first educational theories to depict how beliefs and emotions are inextricably linked. Their model extends the CAMCC to more clearly delineate how emotions function to help or hinder the belief change process. In the *Integrated Model of Belief Change* (IMBC; Ashton & Gregoire-Gill, 2003), emotions, such as dissatisfaction, are hypothesized to interact with prior beliefs and motivational factors to produce a subsequent emotion, which in turn, affects cognitive processing and whether a new belief is formed, which, in turn, affects subsequent emotional reactions and behavior. Thus, beliefs and affect interact iteratively to produce or thwart conceptual change. As an example, the authors presented three fictional preservice teachers who hold the belief that a good teacher is primarily someone who makes learning fun. The teacher educator decides to challenge this belief held by her students by presenting them with a case study of an experienced classroom teacher who also holds this belief and centers her teaching on making learning interesting. Students love her class, but their test scores indicate lower performance than other students in their same grade who had a teacher that focused on strengthening metacognition over making learning fun. Ashton and Gregoire-Gill postulated three different responses to this scenario to illustrate their Integrated Model. The first prospective teacher (P1) becomes emotionally distressed as she realizes that she could be that teacher depicted in the case study (her sense of self is implicated, according to the CAMCC). This leads to a strong feeling of dissatisfaction. The model then posits that if P1 has the concomitant resources (adaptive cognitive and motivational characteristics; Ashton & Gregoire-Gill, p. 114) to tackle this problem, distress might turn into excitement as she realizes the possibilities of helping her future students, or fear as she worries about hurting them with poor instruction. In either case, P1 is highly motivated to cognitively process the case study and her teachers' lecture,

and the upshot of her processing is a positive feeling about her ability to teach metacognitive strategies, as well as a revised belief that teaching metacognition is more important than merely making learning fun for students. Thus, additional levels of specificity with regard to emotional responses and beliefs are added to this model, in comparison to the CAMCC or transactional model. P1's emotions and cognitions cycle back and forth in an iterative process until some kind of cognitive balance is achieved.

The authors discussed two other hypothetical reactions to the case study. P2, due to a prior belief that tests are not valid measures of learning, dismisses the entire case study, thus neither developing an emotional reaction nor engaging in further cognitive processing about the instructor's message. The third hypothetical prospective teacher, P3, has a similar emotional reaction upon hearing the case study as P1, but unlike P1, P3 lacks the cognitive and motivational resources that might lead to an adaptive emotional and cognitive reaction to the case study; rather, P3 experiences anxiety, which leads to superficial belief change to assuage the sense of anxiousness he feels over what he has learned. Without systematically processing the message, however, belief change in P3 is short-lived.

Emotions are central to the IMBC and play a critical role in the belief change process (Ashton & Gregoire-Gill, 2003), and the model is aligned with the latest research in cognitive neuroscience. Clore and Robinson (2012), in their recent summary of the most recent research on emotions and social psychology, supported such "an iterative processing view of emotion elicitation" (p. 315) in which emotions are seen as "situationally constrained affective reactions" (p. 319). Emotions, in their view, are slower than immediate affective reactions, and provide information to the self about progress the individual is making toward his/her goals, thereby facilitating learning. These insights are well-captured by the Integrated Model and have powerful implications for research on belief change. These more nuanced views of the relations between beliefs and emotions have the potential of providing a more realistic understanding of how beliefs and emotions interact to influence teachers' decision-making and practice because they posit multiple ways that affective reactions are central to the belief change process.

BELIEFS ABOUT EMOTIONS THAT INFLUENCE TEACHING

In addition to understanding the relation between teachers' beliefs and emotions, teachers' beliefs *about* emotions are important to better understand the role of beliefs in shaping the emotional life of classrooms. Emotions have a long history in psychological research and have only recently been considered in terms of the educational context as researchers began to see the teaching experience as not only a cognitive activity, but rather, as an emotional endeavor (Sutton, Mudrey-Camino, & Knight, 2009; Zembylas, 2007). Much of the existing research on teachers' beliefs about emotions centers on the issue of emotion regulation, or "the control, management and ways individuals have of relating to their emotions in an attempt to regulate their emotional states" (Manser, Cooper, & Trefusis, 2012, p. 236). Emotion regulation is related to classroom management (Sutton et al., 2009), teacher-student relationships (Sutton & Wheatly, 2003), and positive academic and psychosocial outcomes for students (Gumora & Arsenio, 2002).

A variety of strategies exist to promote emotion regulation in the classroom (Fried, 2011); however, in order to use such strategies, teachers must believe both that they *can* change the emotional climate of their classroom (Linnenbrink, 2006) and that they are the ones responsible for maintaining a positive emotional climate (Williams et al., 2008). That such responsibility lies with teachers is fairly consensual by researchers of emotions in education (Meyer & Turner, 2007; Oplatka, 2007; Schutz, Cross, Hong, & Osbon, 2007; Sutton & Wheatley, 2003). On one hand, teachers believe that regulating their emotions in the classroom makes them more effective teachers (Sutton et al., 2009). On the other hand, teachers do not necessarily believe that their ability to display emotions in the classroom is a mandatory part of the teachers' roles; they see the expression of emotions rather as discretionary and voluntary approach to manage the classroom (Oplatka, 2007). Note, though, that those teachers who choose to engage in positive emotion regulation in the classroom through an ethic of care may find such work both satisfying and "emotionally exhausting" (O'Connor, 2008, p. 125), a burden that many teachers may not want to take on, given the current pressure on teachers to meet increasingly rigorous state standards.

Teachers' beliefs about their emotions, particularly negative emotions, also influence their goals and appraisals made during classroom interactions (Cross & Hong, 2012; Meyer & Turner, 2007; Schutz et al., 2007). How a teacher feels at any particular time and what she believes about her emotions influences her reactions to a particular situation within the classroom setting (Schutz, Aultman, & Williams-Johnson, 2009). For example, beginning teachers who experience anxiety over the complexity of teaching and who have low self-efficacy beliefs about the certainty of achieving the goals they set for themselves in the classroom have a difficult time solving the myriad classroom-based issues that arise (Sutton & Wheatley, 2003). Teachers are more likely to experience and subsequently regulate negative emotions when they believe their goal of promoting student learning is disrupted (Sutton et al., 2009). Further, experienced teachers may down-regulate their negative emotions because they believe it makes them more effective in the classroom (Sutton et al., 2009), and they are more likely to experience anxiety when they are uncertain about whether or not they are doing a good job (Sutton & Wheatley, 2003).

IMPLICATIONS FOR CLASSROOM PRACTICE

One of the key implications of our review of research and theory on the relation between teachers' beliefs and emotions is that emotions matter—they may matter even more than instructional interventions or pedagogical techniques—when it comes to understanding influences on students' learning. Teachers' beliefs are affected by their own emotional experiences in the classroom, which in turn affects their decision-making, which influences student learning. We can no longer afford to ignore emotion when discussing teachers' beliefs about learning. Several implications for classroom practice stem from our review:

1. Having fun is an important part of learning. Teachers ought to increase students' enjoyment and positive affect surrounding learning as these are not incidental "niceties," but key components in effortful cognitive processing and self-regulated learning (Pekrun, Goetz, Titz, & Perry, 2002).

2. Positive beliefs, such as a control beliefs, lead to more positive affect and greater self-regulation (Op 't Eynde, De Corte, & Verschaffel, 2007). Therefore, promoting adaptive self-beliefs should be a component of teacher education programs and an expectation of teachers once they are in the classroom.
3. Teacher self-efficacy beliefs for facilitating students' and their own emotion regulation is important to creating positive learning environments.
4. Teachers ought to gauge students' initial emotional investment and interest in the topic and find ways to increase interest and as well as the emotional salience of the topic.

In addition, specific implications from conceptual change research and teachers' responses to educational reform efforts are highlighted below based on our prior review of the leading iterative models of belief change.

1. Resistance to belief change is fueled by emotion (Frijda, Manstead, & Bem, 2000). Teachers' initial openness to reform messages that challenge their pre-existing beliefs is affected by their emotional reaction to the message.
2. As Clore and Gaspar (2000) noted, emotions provide information and guide attention. Therefore, it is important to take into account both teachers' emotions to new reforms and school initiatives, and it is equally important to pay attention to students' emotions in the classroom.
3. In addition to affecting belief change and directing attention, "Emotions can create new beliefs and strengthen existing ones" (Frijda & Mesquita, 2000, p. 6). Thus, teachers frustrated by the lack of resources for implementing a new reform may end up generating negative beliefs about school administration or state policies that affect their ability to be successful in the classroom.

CONCLUSION

One of the outcomes of this review was to highlight the complex, recursive relationship between teachers' beliefs and their emotions. Such complexity is often ignored in educational research (see Zembylas & Chubbuck, Chapter 10, this volume, for an exception); therefore, we suggest that research on teaching should involve examining teachers' emotions in conjunction with their beliefs, rather than keeping these two fields of research separate, as is currently done in educational research. Studying motivation and other "warm" constructs is not enough: Affect must be an integral part of research on conceptual change.

Conceptually, clarity is needed on whether beliefs ought to be considered a "hot" construct. Beliefs are viewed in the social psychology literature as cognitive constructs. Our recommendation is that beliefs, although they influence affect, not be considered affective in nature, contrary to those who claim that including beliefs in their theoretical models makes them "hot" models of cognition—a practice that began with the publication of Pintrich, Marx, and Boyle's (1993) seminal paper. We think it essential to retain the distinction between affective and cognitive constructs, with beliefs firmly on the side of a cognitive construct, albeit one that influences, and is influenced by, affect.

In conclusion, we know that emotions and affect can no longer be ignored by those interested in research on teachers' beliefs. Teachers' beliefs are important, but if we consider only cognitive factors, we are ignoring a critical aspect of decision-making, judgment, and behavior. Though research is scarce, contemporary, recursive models have the potential for providing a more realistic understanding of the complex realities that create the emotional landscape of classrooms.

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Section IV

Contexts and Teachers' Beliefs

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14

TEACHERS' BELIEFS ABOUT TEACHING (AND LEARNING)

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Our initial purpose of writing this chapter was to review the research on preservice and practicing teachers' general beliefs about teaching and learning. The number and kinds of beliefs that teachers hold and researchers examine are evidenced in the 27 chapters of this volume. We sought to examine those studies that looked across subject/content area specialization at teachers' beliefs about teaching and learning. We argue that beliefs about teaching and learning may be at the forefront of teachers' work and as such serve as filters, frames, and guides for teacher practice including: engagement in professional learning experiences, instructional planning, and classroom interactions (Fives & Buehl, 2012).

We chose to take a content-general perspective in this investigation for two reasons. First, the research exists. That is, while many scholars, researchers, and teacher educators focus on content-specific beliefs (see Chapters 18–23 of this volume), others refer to teachers' beliefs about teaching and learning without respect to content area or if so, only in passing. Therefore, the goal of this chapter was to capture these investigations not examined in the other chapters.

Second, investigations of content-general beliefs about teaching and learning potentially allow for comparisons of teachers' beliefs across teaching content areas and experience levels. Some research suggests that belief specialization occurs with experience (Duffin, French, & Patrick, 2012; Fives & Buehl, 2010). In work with the Teachers' Sense of Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001), researchers have found that preservice teachers are less able to differentiate self-efficacy beliefs for classroom management, student engagement, and instructional practices than experienced teachers, and consequentially report a general sense of teaching efficacy overall (Duffin et al., 2012; Fives & Buehl, 2010). The same issue of belief specialization may also hold true for beliefs about teaching and learning, such that as preservice teachers enter teaching education experiences, they do so with more general notions of what it means to teach and/or learn. These entering beliefs,

sometimes referred to as *lay theories* (Holt-Reynolds, 1991), are typically underspecified beliefs about teaching and learning based on personal experiences as students rather than a studied reflection. Thus it seems reasonable that to examine changes in beliefs or belief development in teachers that a more general assessment of these beliefs may be necessary at initial levels.

CONTEXT AND FRAMEWORK

Much of current education reform, teacher education, and professional development rest on particular perspectives of teaching and learning that serve as a basis for guiding instructional practices. Common among these perspectives are constructivist theories of learning that frequently lead to student-centered approaches to teaching (Windschitl, 2002). However, other beliefs about learning and teaching such as behaviorist learning theories and more transmission, teacher-centered approaches to instruction are also salient in K-12 classrooms. Moreover, researchers of teachers' beliefs have an established tradition of dichotomizing the beliefs teachers' hold into general paradigms that may be too broad to illustrate the nuances and variation of beliefs at work in daily practice.

The first challenge we faced in tackling this literature was both conceptual and pragmatic. There is much disagreement in how one describes beliefs about teaching and learning. In many instances these beliefs are treated as one notion—for example, a “constructivist” perspective on teaching and learning (e.g., Teo, Chai, Hung, & Lee, 2008). In other instances, the researchers have made it clear that they are reporting on perspectives of teaching as “transmission” versus “student-centered” or “child-centered” (e.g., Bunting, 1985). In many of the studies investigated for this review, a vague description of constructivism was contrasted with an equally vague understanding of a “transmission” approach. In some cases it seemed that the researchers were comparing the *learning* theory of constructivism with a *teaching* practice of transmission (e.g., Pederson & Liu, 2003).

Conceptually we agree with Richardson and Placier (2001) and Windschitl (2002), who argued that constructivism is a theory and belief about *learning* and is not a theory of *teaching*. As a theory of learning, constructivism assumes that learners are active in constructing their own knowledge, that social interactions are important in this process, and that learning involves the integration of human biological, contextual, and social influences (see Windschitl, 2002). Almost all theories of constructivism accept these assumptions (cf. Windschitl, 2002; Prawat, 1996; Phillips, 1995).

The purpose of this chapter is to review the empirical literature on teachers' beliefs about teaching and learning. In doing so, we were informed by existing theories of learning and critiques of the convergence of theories of learning with methods of teaching in ways that fail to fully articulate their similarities and differences (e.g., Richardson & Placier, 2001; Steffe & D'Ambrosio, 1995; Windschitl, 2002)

EMERGENT DESIGN

A systematic literature review was completed in the ERIC and PsychInfo databases using the key words *teacher beliefs* (teach* belief*), *learning*, *instruction*, and *teaching*. This initial review was limited to empirical, peer-reviewed articles. Relevant

literature reviews, as well as the reference lists of selected articles, were examined in order to identify articles for inclusion.

Articles chosen for inclusion in this review met the following criteria: (a) a focus on the beliefs of teachers either employed in a K-12 setting or those enrolled in preservice K-12 teacher preparation programs; and (b) a focus on teachers' beliefs about learning and/or instruction at a general content and population level. It should be noted that some seemingly content area specific studies were retained (e.g., Yerrick & Hoving, 2003). This occurred in cases where the focus of beliefs remained at a more general level with respect to teaching and learning despite a context or sample specification. For example, a study of science teachers that examined more general beliefs would be included, but if the study narrowed to beliefs about teaching and learning in science only, it was excluded from this chapter. We initially identified 118 articles. Upon review for content specification, we found 59 final articles that met our criteria and informed our goals for this project.

All articles initially identified were included in an Excel spreadsheet. Following the approach of Fives and Buehl (2012), the authors each examined and initially coded one-third of the articles for the basic contents of the article (research question, design, analysis, and findings). Through multiple meetings and discussions about the goals and scope of this project, we identified emergent themes in this literature and developed specific coding categories to address those themes. Thus, we each re-coded approximately one-third of the articles as studies that investigated and reported on the following: beliefs about teaching, beliefs about learning, the belief-practice relationship, and belief change. We also maintained a column in the spreadsheet for our personal notes and thoughts on the salience of particular articles, potential themes, and personal insights into the work read. Through this analysis and a recursive process, we identified descriptive themes to help us organize the literature.

Briefly, the 59 identified articles included reports of both quantitative ($n = 23$) and qualitative research designs ($n = 36$). Researchers explored the beliefs of approximately 3,551 preservice teachers across 21 investigations, 5,075 practicing teachers across 34 investigations, and a combination of both preservice and practicing teachers totaling 1,879 participants in the remaining 3 investigations that included both participant groups.

FINDINGS

Our findings are organized into four sections. First, we highlight why teachers' beliefs about teaching and learning are relevant for the field of teacher education and development using an exemplar study. This is followed by sections on teachers' beliefs about learning, teaching, and belief change. We close the chapter with a series of insights and recommendations for the field based on our investigation of the literature.

Relevance of Teachers' Beliefs About Teaching and Learning

Teachers' beliefs influence their classroom decisions and behaviors (e.g., Fives & Buehl, 2012; Pajares, 1992). In particular, beliefs about teaching (e.g., how it should be done, what methods are most effective, who is responsible for it, etc.) should

guide the classroom-level decisions of teachers. Fives and Buehl (in press) argued that beliefs function as filters, frames, and guides, and that beliefs about particular concepts/activities may be more or less salient during different teaching tasks. Motivational beliefs, such as self-efficacy, may guide immediate classroom actions, while beliefs about teaching and learning may be more salient during lesson planning and instructional decision making; such beliefs may serve to frame these tasks and help teachers identify the boundaries of the problem space (Fives & Buehl, in press). From this perspective we describe Tadich, Deed, Campbell, and Prain's (2007) investigation which illustrated how beliefs about teaching and learning are relevant in teachers' practice. Please note, when we use the term "practice" we refer to all activities associated with the practice of teaching, including but not limited to lesson planning, assessment activities, instruction, and interactions with students, parents, and colleagues.

Tadich et al. (2007) described a case study in which 24 eighth-grade teachers in Australia believed it was their responsibility as the teacher to elicit and maintain student engagement. Thus, they believed that teaching included engaging students and identified a series of specific instructional strategies (e.g., task choice, novel teaching approaches) to facilitate this goal. While the teachers perceived some constraints in their ability to fully implement such practices, they did attempt to be less directive and give students more choices in the classroom. Further, Tadich et al. (2007) suggested that these teachers were questioning a more traditional teacher-led approach. Such attempts at change in practice could not begin without teachers believing that engagement is part of teaching and that routes to engagement included varied instructional approaches and student choice. This investigation offers descriptive insight into the practice of teachers and their need to balance and weigh beliefs about learning (what students need to learn, in this case engagement) and beliefs about teaching (how teachers design and implement instruction and assessment).

Teachers' Beliefs About Learning

Through our search procedures and parameters, we found only a few studies that directly focused on teachers' beliefs about learning (Chan, 2011; Brownlee & Chak, 2007). In this section, we highlight Chan's (2011) research as an exemplar of research on teachers' beliefs about learning. Brownlee and Chak's (2007) study is discussed in the section on change in preservice teachers' beliefs. Chan (2011) used the term "conception" to refer to beliefs about learning and examined conceptions of learning from a perspective that delineated two broad categories of learning—quantitative and qualitative. Quantitative learning referred to a more shallow measure of how much knowledge is acquired and reproduced while qualitative learning is a deeper conception regarding a change in one's views and understanding through learning. Chan (2011) measured the learning beliefs of 231 preservice students in Hong Kong using the Conceptions of Learning Inventory (COLI) developed by Purdie and Hattie (2002). Beliefs were measured by responses to 45 items that fell along 9 separate dimensions of learning. For example, learning could be viewed as a means to an end (i.e., "I have really learned something when I am able to use it in daily life"), or as a degree of understanding (i.e., "Learning is making sense out of new information and ways of doing things") (Chan, 2011, p. 91). Overall, mean scores

of the dimensions representing qualitative views of learning were higher than scores categorized as quantitative. Chan (2011) concluded that these teacher education students were more likely to adopt a qualitative rather than a quantitative conception of learning. However, it is important to note that in this investigation, conceptions of learning were treated as dependent variables in a structural equation model where epistemological beliefs (beliefs about the nature of knowledge) were found to predict conceptions of learning. These findings led Chan (2011) to the recommendation that teachers and teacher educators help learners explore their epistemological beliefs so that conceptions of learning might be addressed. What this study does not evidence is whether the differing conceptions of learning led to more or less adaptive practice in these student teachers. The assumption is that conceptions of learning as understanding, rather than as remembering or increasing knowledge, are more desirable.

While we agree with this perspective in general, we think that Chan (2011) and others reviewed in this chapter and handbook, should consider the empirical ramifications of particular beliefs given the socio-political contexts of teachers' professional lives. Muis (2004) offered an alternative to the evaluative description of epistemological beliefs as either sophisticated or naïve. She suggested that researchers need to consider the context of learners and offered the notion of more or less "availing" beliefs as determined within contexts (p. 324). Availing epistemological beliefs are those that are "positively related to quality learning and achievement" (Muis, 2004, p. 324). Such a perspective may be warranted when one considers the professional contexts of teachers' lived experiences. The notion of more or less availing beliefs suggests that for some contexts with particular learning goals, identified potentially at the school, district, state/region, or national level, seemingly less desirable beliefs may, in fact, be more availing to teachers in context. This, however, like any connections of particular beliefs to practice needs to be examined empirically.

Teachers' Beliefs About Teaching

Teachers possess a wide range of beliefs about teaching. Included in this review are investigations of teachers' beliefs about generalized approaches to teaching such as transmission of knowledge (e.g., Hancock & Gallard, 2004), constructivist teaching (e.g., Pederson & Liu, 2003), and student-centered practices (Snider & Roehl, 2007). In all of these studies, researchers attempted to identify and make explicit teachers' beliefs about what constitutes good teaching in a multitude of settings and across a range of content areas. Next, we provide an overview of the most common approach to this work, which seems to be a dichotomous sorting of teachers' beliefs into more progressive (e.g., child-centered; constructivist) or more traditional (e.g., teacher-centered, transmissionist) approaches to teaching. This is followed by a discussion of evidence provided by some researchers that suggests teachers are able to hold multiple, potentially competing beliefs at the same time (e.g., Niyozov, 2009; Snider & Roehl, 2007).

Dichotomized perspectives on teaching beliefs. While there are many conceptualizations of teachers' beliefs about teaching, much of the literature has evolved to focus on two broad categories: (a) student-centered models, typically reflecting constructivist views of teaching and (b) teacher-centered models, typically a

transmission model of teaching (e.g., Bunting, 1985; Ling, 2003; Richards & Gipe, 1994; Teo et al., 2008). In these investigations, the two categories are frequently pitted against each other and used as a lens for comparisons.

In 1985, Bunting attempted to validate prior work in which she identified four separate dimensions of teachers' educational beliefs— affective and cognitive educational values, directive teaching behavior, and relevancy in subject matter (i.e., linking subject matter to larger global issues). Using a sample of 320 teachers of grades kindergarten through six, Bunting (1985) analyzed responses to an inventory of 81 statements reflective of the beliefs listed above. This analysis revealed two independent dimensions of beliefs held by teachers— student-centered and directive factors. Student-centered factors included the importance of students' emotional development, the active and direct involvement of students in the learning process, and the development of students' problem-solving skills. The directive factor included statements that were highly teacher-directed and controlling of the educational process. This finding suggests that teachers' beliefs about teaching and learning, when assessed through Likert-type scales, may collapse into a hierarchy of shared philosophies and that the theoretical distinctions among beliefs within a single paradigm were not discerned with this instrument and may be difficult to tease apart.

This juxtaposition between teacher- and student-centered beliefs is also evident in the findings of other researchers (Ling, 2003; Richards et al., 1987; Richards & Gipe, 1994; Teo et al., 2008). For instance, using metaphors, analysis of student journal entries, and classroom observations, Richards and Gipe (1994) found that elementary education majors held teaching beliefs that could be categorized as either *teacher as information giver* or *student-centered*. Their study looked at preservice teachers' beliefs at both the beginning and end of a semester-long course that included fieldwork in an urban elementary school and seminar discussions. The majority of the preservice teachers studied demonstrated belief orientations reflective of the *teacher as information giver* perspective during both pre- and post-course analysis. The use of metaphors, along with semi-structured interviews, was also employed by Ling (2003) to study the beliefs of nine kindergarten teachers in Hong Kong. These practicing teachers also perceived the teacher as being a transmitter of knowledge, or information giver, who must focus on the objectives of teaching, such as lesson planning and the delivery of lessons in an orderly and timely fashion, rather than on the learning process itself and meeting the learning needs of children (which would be more in line with Richards & Gipe's [1994] notion of student-centered). Additionally, none of the teachers in Ling's (2003) study mentioned the students' control of and responsibility for their own learning; these teachers expressed very few, if any, beliefs and practices that reflected the more student-centered philosophy endorsed by more Western-influenced early childhood education programs. Similar beliefs were found by Teo et al. (2008) among 582 Singaporean preservice teachers. Teo et al. (2008) concluded these preservice teachers adopted a more transmissionist, as opposed to a constructivist, view of teaching.

A traditional, teacher-centered model of instruction was also found to be prevalent among a team of four eighth-grade mathematics teachers in a suburban middle school in Florida (Gill & Hoffman, 2009). These findings were based on an analysis of teacher discourse during their shared planning time. Common traditionalist beliefs held by the teachers included the importance of problem solving only

after teaching the rules (e.g., algorithms, procedures); the use of extrinsic rewards to increase student learning; textbooks as the primary source of information; and the belief that students' intellectual ability is limited, stable, and innate.

Taken together, the studies reviewed in this section evidence a trend to dichotomize beliefs about teaching along constructivist (student-centered)—transmissionist (teacher-directed) lines. Also salient across these studies was the pervasive perspective that constructivist beliefs (and practices) were more desirable, regardless of the teachers' sociopolitical context that could have rendered such beliefs more or less availing. Further, by and large, these investigations did not investigate *why* teachers adopted the teaching beliefs they did. One exception to this trend is an investigation by Pederson and Liu (2003), who described the concerns of particular teachers regarding the implementation of a student-centered approach.

Pederson and Liu's (2003) qualitative case study focused on the concerns and beliefs of teachers regarding student-centered learning. Researchers observed and interviewed 15 middle-school teachers who implemented a computer-based program designed to support a student-centered teaching model. When describing their role during this and other teaching activities, most teachers described themselves as facilitators. They also generally believed that collaboration between students was a valuable teaching technique to enable students to learn how to work together but not necessarily to improve problem-solving and communication skills. Teachers also reported beliefs that factual information could not effectively be learned through student-centered instructional techniques. Most of the teachers did, however, believe that the students' struggles during these types of activities were beneficial and led to greater learning. One teacher in this study commented: "We talk in the scientific method that you sometimes don't get the right answer but you still learn something from the wrong answer. So I think it's extremely valuable" (Pederson & Liu, 2003, p. 72).

Alternatively, another teacher reported a lack of belief in the constructivist approach to problem solving, namely a concern that student-centered activities caused confusion and frustration. She remarked that she disliked and found frustrating workshops where the materials were set out and she was expected to make something without direction. As a result, this teacher reported "I usually give them some [direction] just because it's frustrating for me" (p. 66). This illustrates the power of beliefs in guiding teachers' classroom decisions and practices and the need to examine teachers' beliefs about both teaching practices and learning theories. It seems that this teacher is unaware of the Piagetian (1961) process of equilibration, which argues that learning is a process of adapting, through assimilation and accommodation, to discordant events in the environment. That is, learners must feel a sense of disequilibrium in order to engage in problem solving and construct new meaning. A teacher who does not believe in the processes of adaptation and equilibration as the foundations for learning, would not endorse less directed learning activities as a sound instructional approach. Thus, in addition to other factors influencing pedagogical decisions, a lack of a full appreciation of the theoretical basis of constructivism as a learning theory rather than a repertoire of pedagogical strategies may influence teachers' beliefs about learning principles and the implementation of those principles in teaching practice.

Ability to hold multiple beliefs. Snider and Roehl (2007) investigated beliefs about constructivist and explicit teaching practices as they analyzed the survey

responses of 344 teachers in kindergarten through grade 12. Results indicated that one-quarter to one-third of these teachers agreed with statements consistent with constructivism, even though these same teachers also espoused support for explicit instruction. The majority of the teachers, however, were inconsistent or undecided about their pedagogical beliefs. Cheng, Chan, Tang, and Cheng (2009) found a similar intermingling of beliefs in their study of 228 student teachers' epistemological beliefs and conceptions of teaching. Overall, the student teachers in this study strongly believed that the constructivist approach was the best teaching strategy, and they all expressed a preference for teaching strategies related to a student-centered approach. When comparing epistemological beliefs with conceptions of teaching, however, some apparent contradictions arose. Four student teachers espoused sophisticated epistemological beliefs yet held mixed conceptions of teaching, while 11 student teachers expressed mixed epistemological beliefs yet still possessed constructivist conceptions of teaching. There is a concern here that these teachers may be learning the appropriate language of educational contexts and appropriating it without actually committing to these beliefs.

Similar contradictions in teachers' expressed beliefs were described by Verjovsky and Waldegg (2005) in a case study of one biology teacher, Maria, from a Mexican public high school. Maria's beliefs about teaching and learning were inferred from triangulating data of semi-structured, in-depth interviews, classroom discourse, and questionnaires. Findings suggested that Maria held a positive attitude about the basic principles of constructivism (i.e., students must construct their own knowledge, students are active participants in the learning process, and teaching should be connected to students' lives). Regarding her views on teaching, while Maria expressed numerous teacher-centered beliefs, such as "I'm going to fill them with new information to enrich them" (Verjovsky & Waldegg, 2005, p. 473), she was also concerned with motivating the students to learn and connecting biology to other sciences, which are more student-centered goals. The results of this investigation provide more support for the notion that teachers do not always adhere to one single pedagogical belief, but instead, they blend extreme perspectives or shift beliefs based on the salience of the task.

Niyozov (2009) argued that putting beliefs into two separate buckets of "teacher-centered" and "child-centered" is too simplistic. We must look at the goals and ethics of the teacher to truly understand the teachers' beliefs and whether he/she is acting on them. A child-centered teacher may use direct instruction if he/she feels a group discussion may not respect the child's ideas. Thus, one cannot just look at the practice and assume the teachers' beliefs. For example, teachers in Niyozov's (2009) study reported not using cooperative learning, not because they did not like cooperative learning, but because the students could not have their backs to the pictures of the government leaders on the classroom wall. Complexities such as these can only be revealed through a close investigation of teachers' belief systems and contexts of practice.

Trends in Belief Change

Our review of the literature suggests that, as a result of learning and educational experiences from kindergarten through college, strong beliefs about teaching and learning are deeply imbedded and formed in the minds of most teachers—preservice

and veteran alike. According to Kagan (1992), these beliefs are tenacious and difficult to change. However, changing beliefs about teaching and learning among preservice and practicing teachers is crucial if teacher educators hope to change instructional practices, as these beliefs are at the heart of most aspiring and practicing teachers' ideas of what constitutes good teaching.

As Wideen, Mayer-Smith, and Moon (1998) determined in their review of preservice teacher learning, beliefs serve as a strong filter for how preservice teachers experience and respond to teacher education programs. Therefore, exposing deeply held beliefs is a difficult but necessary process to enable preservice teachers to critically examine and understand the content of their future profession. If emphasis is placed on teachers' skills only, and teachers' beliefs are not taken into account, any change in instruction is hindered (Alger, 2009). Changing—or at the very least, challenging—beliefs is also important because static, implicit, beliefs may limit (as filters) the range of ideas or actions that preservice teachers are willing to consider (Alger, 2009; Fives & Buehl, 2012).

In this section, we will look at research on two broad approaches examined in the field to understand changing teachers' beliefs about teaching and learning: preservice coursework, fieldwork, and practice; and professional development. Then, we will look at the effect of experience alone in the alteration of teachers' beliefs.

Belief change during preservice preparation. Preservice teachers come to teacher education experiences with deeply held beliefs. Despite Wideen et al.'s (1998) conclusions that teachers' beliefs are not easily changed, several of the researchers whose work we reviewed showed that beliefs about teaching and learning are malleable. Several researchers found that they could effect changes in preservice teachers' beliefs by immersing them in preservice courses that require a variety of experiences, such as workshops, reflection activities (Brownlee & Chak, 2007), and immersion in the field (Ozgun-Koca & Sen, 2006). Further, Brownlee and Chak (2007), in a study of early childhood education students from Hong Kong who engaged in an international field experience in Australia for two weeks, found that participating students demonstrated stronger beliefs about guided rather than directed instruction, as well as an increase in their belief that children “learn by doing” following their international observations (2007, p. 16). Their study included visits by the preservice teachers to universities and early childhood settings, attendance at workshops and discussions, and written reflections. At the beginning of the study, preservice teachers made only 9 affirmative comments about learning as active discovery, or the belief that children learn through exploration and life experiences. At the end of the investigation, this increased to 34 comments in support of learning as active discovery with an additional 6 comments reflecting beliefs about learning as active understanding, or meaning making.

Student teaching as part of a teacher education program also served as a catalyst for change in preservice teachers' beliefs (Nettle, 1998; Ozgun-Koca & Sen, 2006). Ozgun-Koca and Sen (2006) reported that definitions for “teaching” changed over the course of the student teaching experience for 51 preservice Turkish teachers. Before student teaching, participants indicated that teaching was foremost about subject matter knowledge. Afterward, the importance of pedagogical content knowledge and instructional techniques began to outweigh mere subject area knowledge for these preservice teachers. Preservice teachers also changed their beliefs about

effective teaching from a focus on communication skills, personality, and friendly interactions with students to skills centered on methodology, pedagogical content knowledge, and classroom management. In contrast to these results, Nettle (1998) found that the majority of preservice teachers did *not* change their orientation to teaching as a result of their student teaching experience. For those preservice teachers who did change their beliefs, however, it was noted that their approach became more task-oriented, or teacher-directed, rather than affective, or humanistic in nature.

Other researchers also found less than desired belief changes among preservice teachers despite the efforts of teacher educators (Chai, Teo, & Lee, 2009; Haney & McArthur, 2002; Lim & Chan, 2007). In a 2009 study in Singapore, after participation in a nine-month teacher preparation program, preservice teachers reported beliefs that reflected less emphasis and value on student effort and constructivist teaching methods and more on innate ability and traditional teaching practices (Chai et al., 2009). Perhaps, as suggested by these authors, this was influenced by the high-stakes testing environment of Singapore's educational system or the multiple demands facing teachers, which speaks to the myriad influences on teacher beliefs. Based on findings from case studies of four prospective teachers, Haney and McArthur (2002) also suggested that high-stakes testing and the existing curriculum hindered preservice teachers from changing their core beliefs and further sharing control of learning with their students. Resistance to change was also evident in a study of 19 preservice teachers enrolled in a technology course designed to encourage the adoption of constructivist beliefs and practices (Lim & Chan, 2007). While the examination of artifacts such as lesson plans and reflection notes suggested a change from a more traditional set of pedagogical beliefs to constructivist ones, exposure to a constructivist learning experience indicated no statistically significant change in teachers' instructional or pedagogical beliefs.

It is important to note that several investigations highlighted *mixed* results with regard to the desired teacher belief change (Hancock & Gallard, 2004; Leavy, McSorley, & Boté, 2007; Yerrick & Hoving, 2003). Overall, the pre-post analysis of 124 Irish and American preservice teachers' metaphorical representations of teaching and learning indicated a slight drop in behaviorist beliefs and a distinct increase in metaphors classified as constructivist (Leavy et al., 2007). A closer look at these results, however, revealed that Irish preservice teachers' beliefs were resistant to change and that they tended to hold on to their behaviorist beliefs, while American students' beliefs changed more readily to become predominantly constructivist in nature. These differences may have been due to the nature of changes made by the Irish students which reflected more complex and detailed perspectives on teaching rather than philosophical shifts, a limited amount of explanation of the purpose of these metaphors, or perhaps most concerning, that these preservice teachers upon direct experience in the complexities of the classroom reverted to more behaviorist perspectives.

Enrollment in a science methods course, along with participation in field experiences, was also not enough to consistently change the teaching and learning beliefs of preservice teachers. Yerrick and Hoving (2003) identified "reproducers" as those preservice teachers who resisted change, taught as they had been taught, and continued to hold traditional, transmission views for teaching science. Producers, on

the other hand, reflected on their practices and were able to revise their practices, become constructors of new knowledge, and focus on their students' learning. This same combination of methods courses and fieldwork experiences both reinforced and challenged the beliefs held by preservice science teachers in a study by Hancock and Gallard (2004). Based on their analysis of the data from the five case studies, the researchers concluded that teachers' beliefs were modified, rather than changed, as some preservice teachers began to design more students-centered instruction while others' beliefs shifted toward a more teacher directed approach.

Belief change and professional development. Professional development, if it is to be instrumental in affecting change, should also provide teachers with a multitude of experiences during its implementation including opportunities to observe, experience, and reflect. Illustrating the importance of active reflection and collaboration is the work of Goodnough (2008). In this investigation, teachers participated in a community of practice. A community of practice is defined as a group "of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (Wenger, McDermot, & Synder, 2002, p. 4). In Goodnough's (2008) investigation, the six Canadian teachers who were geographically spread conducted formal online meetings (after meeting initially face-to-face in an all-day session) to plan and help each other understand science teaching through inquiry. After participating in the community of practice, these teachers' beliefs about assessment reflected an emphasis on the affective domain in learning, and beliefs about inquiry changed to broader conceptions of the strategy, and beliefs in their abilities to set goals and improve teaching were developed.

Hunsaker and Johnston's (1992) research included a four-year longitudinal study of one teacher's changing beliefs and practices through a one-to-one project that included critical reflection and collaboration with a professor. In this qualitative investigation, the nature of beliefs shifted from beliefs about how one becomes knowledgeable as a teacher. In the beginning the teacher perceived becoming knowledgeable as a teacher as something received from experts. Later, after actual experience, the source of this knowledge was seen as the result of personal experimentation. In their work, they found that belief change, though slow, was dramatic. Thus, in each of the professional development initiatives, positive changes in teachers' beliefs came about through multi-tiered approaches.

Experience alone as the change agent. We found a collection of studies that suggested experience alone (that is without any other intervening facilitators) can be a strong predictor of belief change in both experienced and preservice teachers (Alger, 2009; Cook & Young, 2004; Simmons, et al., 1999). According to Cook and Young (2004), if teacher educators are to combat the firmly rooted beliefs that preservice teachers bring with them into teacher education programs, then they must understand the most powerful ways to do this, namely that interactions with children have power to disrupt and change teacher beliefs. Such interactions offer personal mastery experiences that teachers may perceive as more credible and valid than secondary reporting of classroom activities. Through analysis of weekly reflections about beliefs, Cook and Young (2004) found that the 18 preservice teachers they followed reported that their beliefs were challenged and changed regarding what teachers do, how they should be, and what they should know as a result of their interactions with

students. This finding is in keeping with Jones and Vesilind's (1995) finding that "interaction with pupils in schools is the most powerful source of information in constructing the beliefs of preservice teachers" (p. 355).

Some evidence suggests that change is also possible for practicing teachers. Alger (2009) examined 110 secondary teachers' beliefs about the nature of teaching as evidenced in reflective self-report of metaphor change at the beginning of their teaching careers, their present perspective, and the ideal metaphor (note all data were collected at one time). In this study, 63% of the teachers reported a different perception of teaching from their overarching metaphor as a beginning teacher and their current perspective (p. 748). Specifically, the percentage of teachers who believed that the teacher's role was *to guide*, or *to provide tools*, increased from the beginning of their careers. Those who believed teachers were part of a community along with their students in co-constructing their learning also increased. These findings suggest that practicing teachers' beliefs may be open to change given time and opportunity to work with students. Alternatively, this finding may also demonstrate that as teachers develop a richer understanding of the classroom context, they may reclassify some of their earlier beliefs through reflection.

The experience of teaching as the sole facilitator of change is also evident in an exploratory study of first-, second-, and third-year secondary science and mathematics teachers (Simmons et al., 1999). Through the analysis of in-depth interviews, classroom environment surveys, and classroom observations, the researchers concluded that beginning teachers enter the profession with a variety of beliefs about what teachers should be doing in the classroom, and over the three years of the study, significant belief changes were observed. Overall, first-year teachers demonstrated teacher-centered beliefs and behaviors, but by the time teachers entered their third year of teaching, they tended to "wobble" between teacher- and student-centered practices (p. 80). Additionally, over time, teachers also vacillated in their philosophy of teaching and their views of themselves as teachers. Simmons et al. (1999) suggested that this may be a result of their enculturation to a particular school system and their concern about obtaining tenure.

INSIGHTS AND RECOMMENDATIONS

As stated, our initial goal was to provide a review of the literature on teachers' general beliefs about teaching and learning. We sought to develop a clear understanding of the research terrain including a descriptive conception of the kinds of beliefs examined, the relation of those beliefs to outcomes of interest (e.g., practice), and findings related to belief change. Our review has left us with a series of insights and recommendations to consider when embarking on research, teaching, or personal reflection on beliefs about teaching and learning.

Explorations of beliefs about teaching must also consider beliefs about learning. The limited focus on teachers' beliefs about learning, in general, was surprising to us as we identified literature in the field. Moreover, a review of the studies we excluded from our initial pool did not indicate that there were more investigations of beliefs about learning within content/subject area domains. This lack of research seems problematic to us, as we view beliefs about learning as the foundation to

perspectives and decisions about teaching. This was illustrated in the study by Pedersen and Liu (2003) with the teacher who could not reconcile the student-centered teaching practice with the potential for students to feel frustrated. The underlying cognitive constructivist learning principle of disequilibrium (Piaget, 1961) went unaddressed by this teacher or these researchers as an explanation for the lack of commitment or belief in this teaching method. Potentially, when researchers claim a mis-match between the beliefs and practices of teachers with regard to constructivist teaching practices, it could be that there is an underlining mis-alignment between teachers' beliefs about learning and their beliefs about teaching that has gone untapped and needs to be reconciled. Across the investigations reviewed here, there seems to be an overwhelming tendency to ignore teachers' beliefs about learning in favor of examining their beliefs about teaching. We are concerned that this focus may be limiting what the field can explain and recommend for teacher educators. Research on teachers' beliefs needs to expand to clear investigations of beliefs about learning as distinct from beliefs about teaching, as the former serve as the foundation for the latter.

Clarity in definitions. Given the great diversity in how beliefs about teaching and learning are defined and assessed, it seems an essential step for all researchers in this field to take pains to provide explicit definitions of the beliefs measures, clear operationalization of those beliefs, and transparent explication of the theoretical framework that biases the research. This call for clarity in belief research is not new (see Fives & Buehl, 2012; Pajares, 1992) but is perhaps more salient with respect to attempts to identify more global beliefs about teaching as student or teacher centered. Along with the need for clarity in defining beliefs is the need to maintain consistency in grain size of comparative beliefs. It is unreasonable to evaluate “constructivist” versus “transmission” beliefs about teaching. Constructivism refers to a large scale cadre of learning theories that could span from the radical constructivism of von Glaserfeld (1981), to Mayer's (1996) explication of information processing as constructivist, to the foundational theories of Piaget (1961) and Vygotsky (1978). As such, the term “constructivism” could mean any range of beliefs about *learning* and in turn could suggest a variety of *teaching* practices that reflect those beliefs. In contrast, beliefs that teaching is “transmission” seems to reflect a one-dimensional model of instruction rooted in a behaviorist conception of learning and a teacher-centered belief about teaching.

The problem of understanding research associated with constructivist (student-centered)—transmissionist (teacher-centered) teaching is worsened in studies that compare a ubiquitous notion of “traditional” instruction, which is clouded in sociohistorical and cultural perspectives that make this term almost uninterpretable, with other conceptions of instruction or learning. Seaman, Szydlik, Szydlik and Beam (2005) provided evidence of difference in beliefs about constructivist principles replicating a 1968 study in 1998. The students in 1998 were far more receptive to constructivism than their predecessors 30 years earlier; this study provides some evidence that perhaps the very notion of “traditional” learning and instruction, in the US or region where this investigation took place, has shifted through the constructivist movement that has taken place in education during the past decades.

As researchers and teacher educators embark on investigations or reflections on teachers' beliefs about teaching and learning, it is essential that these beliefs are well defined for both research purposes and classroom practices. The hallmark of a professional field is a shared professional vocabulary; when teacher educators resort to short-hand references of teaching and learning beliefs in their work with preservice and practicing teachers, they potentially perpetuate an oversimplification of these ideas.

Multiple beliefs perspectives need to be explored. The variety of complex beliefs about teaching and learning should highlight the need for teacher educators to offer preservice and practicing teachers ample time and opportunity to reflect on these myriad beliefs and expose how these beliefs support or inhibit effective classroom practices. At the same time, it is important to recognize that teachers, indeed all humans, hold multiple differing beliefs simultaneously that may be made more or less salient during particular tasks or in specific contexts (Fives & Buehl, in press). Researchers and teacher educators need to help teachers to understand their multiple beliefs and the potential triggers or contexts that evoke one belief or set of beliefs over another.

Changing teachers' beliefs. In our final section of findings, we described research about the nature of change with regard to teachers' beliefs about teaching and learning. Important in this work is the consistency of inconsistency in the findings: sometimes beliefs change and sometimes they do not. Lacking in this work however, is a clear theoretical, empirical, or ethical rationale for why teachers' beliefs should change. It seems that in most of this work there was an assumption that teachers' beliefs were not availing for the kind of practice the researchers hoped to see enacted. Potentially, the barrier to changes in teachers' beliefs about teaching may be their evaluation of the new belief(s) as being more or less availing in their professional contexts. Belief change, in some cases, may not be based on evidence of potential best practices or effective teaching, but instead based the teachers' evaluation that the new beliefs will serve them pragmatically in their school contexts. Further, in many instances we found that while teachers may hold the "desirable" constructivist beliefs about teaching and learning, they also recognized and held beliefs about the school context and their own ability to act on these beliefs. Thus, changing beliefs about the nature of teaching and learning may be insufficient to bring about change in practice that is reflective of those beliefs. Finally, given the variability in findings on the relation of beliefs to practice, it seems that more work needs to be done to understand how beliefs function before we engage in wholesale efforts to change teachers' existing beliefs about teaching and learning.

CLOSING

Understanding what we do about teacher beliefs and their relationship to practice, teacher educators can seek to cultivate those beliefs in preservice teachers to influence their practice in their classrooms. According to Angell (1998), existing beliefs can represent obstacles to new conceptualizations of teaching, yet beliefs can facilitate professional growth if they are articulated as tools for reflection. In studying these and other ways teacher beliefs can change, teacher developers can seek to create professional development opportunities that challenge existing beliefs and thus transform existing practices.

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15

TEACHERS' INSTRUCTIONAL BELIEFS AND THE CLASSROOM CLIMATE

Connections and Conundrums

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Teachers form beliefs based on numerous factors, for example, teaching experience, underlying teaching philosophy, personal values, stereotyping, and personal background, all of which ultimately affect how teachers design instruction and what students will learn (e.g., Pajares, 1992). The classroom climate can be understood as a combination of the interrelated instructional and socioemotional climates shaped by teachers and created with students in classrooms. The instructional climate is formed through teachers' pedagogical decisions. The socioemotional climate of a classroom results from the ways in which teachers interact with students and the relationships they foster both with the teacher and among the students. Together the instructional and socioemotional structures of the classroom serve to create the classroom climate. Hence, the classroom climate can be defined as a combination of the instructional and socioemotional environments in which students live their classroom life (Babad, 2009).

Beliefs inform the instructional strategies that teachers use in the classroom. Teachers will teach differently depending on their beliefs about how instruction should be delivered (see Fives & Buehl, 2012; Pajares, 1992). In turn, the way that teachers teach and their interactions with students during instruction contribute to the relationships that are created in the classroom and therefore to the socioemotional climate of the classroom (Rubie-Davies & Peterson, 2011). This is because teachers' beliefs about student learning and about how to teach can lead them to instruct and to interact with students in particular ways. Thus, teachers' beliefs are powerful contributors to the class climate (Rubie-Davies & Peterson, 2011).

The primary purpose of this chapter is to discuss the ways that teachers' beliefs can frame teacher instructional decisions and practices, become associated with the

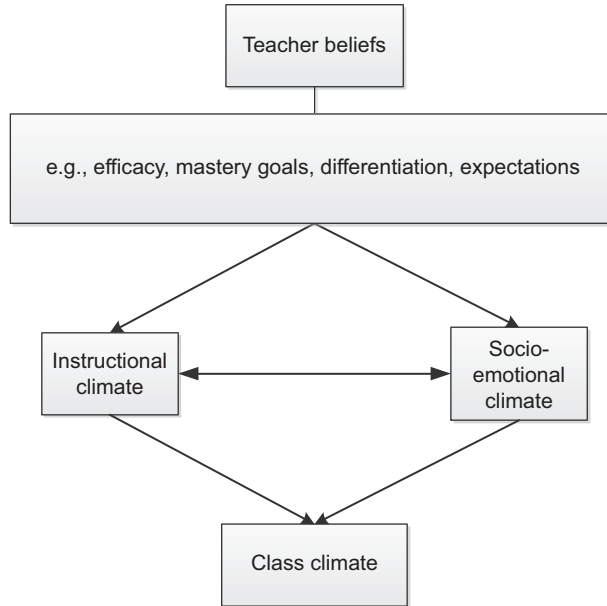


Figure 15.1 The contribution of teachers' beliefs to the class climate via the instructional and socioemotional climates.

social and emotional aspects of the classroom and, therefore, influence the class climate. The relationships between teachers' beliefs, the instructional climate, the socioemotional climate, and how these contribute to the classroom climate are illustrated in Figure 15.1. This figure serves as a framework for the ideas that will be presented in this chapter. I begin with an overview of the influence of teachers' beliefs on the instructional and socioemotional climates of the classroom. Next, I introduce four belief constructs that have particular relevance for influencing teacher practices and subsequently the instructional and socioemotional climate of the classroom. The belief constructs that I focus on are: teachers' sense of efficacy, mastery goal beliefs, beliefs about differentiation, and expectations for students. I introduce these beliefs in turn and describe how each belief can shape both the instructional and socioemotional climate of the classroom. The chapter concludes with an overview of how these beliefs, accepted as different psychological constructs in research, appear to contribute in similar ways to how teachers structure learning and the socioemotional aspects of classrooms.

TEACHERS' BELIEFS AND INSTRUCTION

Teachers' beliefs have important consequences for both instruction and student-teacher relationships. For example, Solomon, Battistich, and Hom (1996) showed that teachers working in low socioeconomic areas believed that students needed a very structured learning environment. This led the teachers to provide students often with drill and practice worksheets which were completed at their desks. Peer interaction was discouraged and teachers were vigilant about monitoring student behavior because they

believed that the students were disruptive. The same teachers acknowledged that the types of learning tasks they assigned to students were boring for them. Further, they conceded that they would use far more innovative and challenging learning experiences with students in middle-class schools. Hence, the beliefs of teachers lead them to structure the instructional environment differently depending on the students they were teaching.

The degree to which teachers take responsibility for student learning has been found to influence other instructional practices. In a study by Davis, Ashley, and Couch (2003), the researchers found that some teachers took responsibility for the learning of low achievers and planned appropriate learning opportunities for them. Other teachers believed that it was the responsibility of outside agencies to design appropriate instructional programs for struggling learners and, therefore, the latter group was more likely to refer low achievers for specialist help than were teachers from the former group.

Relationships between teachers' literacy beliefs and practice have also been reported. For example, Richardson, Anders, Tidwell, and Lloyd (1991) found that Grades 4, 5, and 6 teachers who believed that reading skills need to be learned before students can comprehend text, adopted an approach focused on the teaching of skills and vocabulary. Alternatively, teachers who believed that students learn to read by reading incorporated a whole language approach into their pedagogy and used authentic literature as the basis for lessons.

Similarly, the beliefs of teachers about effective instructional strategies in mathematics and consequent practices have been examined. For example, Wilkins (2008) found that teachers who believed inquiry-based learning was effective tended to use this instructional approach more often in their teaching. Interestingly, Wilkins also found that teachers with greater mathematics content knowledge had weaker beliefs in the effectiveness of inquiry learning and did not use these practices in their teaching. This is an important point that will be emphasized further later in this chapter: teacher characteristics and attitudes can modify beliefs.

Assessment is a further area where teachers' beliefs may influence their instructional practices. In New Zealand, a country that until very recently had no formal standardized assessment at the elementary school level, Brown (2009) found that teachers believed that assessment could be used to improve student learning. As a result they used informal processes and formative assessment practices aimed at encouraging deep learning. The teachers also believed that formal, standardized assessments could only provide information about student surface level learning and so did not use this form of assessment. In contrast, in China, where students complete standardized tests regularly, teachers also believed that assessment could be used to improve student learning but they believed that students were accountable for their own learning and as a consequence they used examinations to determine the effort that students had made to learn the material (Brown, Kennedy, Fok, Sang, & Yu, 2009).

TEACHERS' BELIEFS AND THE SOCIOEMOTIONAL CLIMATE

The classroom is a social context and teachers' sensitivity to students and the degree to which teachers believe that responding to students' emotional and social needs is important, appear to contribute to the ways that teachers interact with students, the

feedback they provide, and the warmth they display (Babad, 2009; Weinstein, 2002). These teacher behaviors contribute to the socioemotional climate in which learning is fostered. Hence, learning occurs not just within an instructional context but also within a socioemotional one. This is because at the core of teaching and learning are relationships.

The norms, values, goals, and interactions of teachers, all of which stem from their pedagogical beliefs, shape the relationships that teachers have with students, and the interpersonal relationships of the classroom contribute substantially to the class climate (Rubie-Davies & Peterson, 2011). For example, positive student-teacher relationships in Grade 6 have been associated with fewer behavioral problems in Grades 7 and 8 (Wang, Selman, Dishion, & Stormshak, 2010). Further, Skinner and Belmont (1993) found a strong reciprocal relationship between teachers' behaviors and students' classroom engagement in elementary school. The interactions of teachers with students predicted students' behavioral and emotional engagement in the classroom. Further, teachers' liking for students was communicated to them and this had fundamental effects on the way students experienced teacher interactions. Overall, the levels of teacher involvement with students reported by both teachers and students were high. However, when teachers were less involved with students, the students reported a distant teacher-student relationship and conveyed how teachers were less consistent and more coercive. Hence, the quality of the relationships which teachers believe is important to foster in classrooms both with and between students contribute substantially to the socioemotional climate and therefore to the class climate.

Because the classroom context is one in which relationships are formed and sustained, it is also a place in which teachers and students experience and display emotions. Every interaction between a teacher and her students triggers an emotional experience (Brown, Jones, LaRusso, & Aber, 2010). Therefore, the emotions that permeate the classroom contribute to the class climate. In a recent study, teachers' beliefs at the beginning of an academic year about their ability to recognize others' emotions and to understand and self-regulate their own emotions were strongly related to the establishment of high-quality social processes within their elementary school classrooms by the end of the year (Brown et al., 2010). Moreover, Brown and colleagues (2010) found that teacher self-report of their emotional abilities was related to supportive teacher behaviors and to teacher-student interactions.

The importance of teacher support as contributing to the class climate has also been found in middle school (Jia et al., 2009). Jia and colleagues found that in both the U.S. and Chinese contexts, teacher support strongly predicted student self-esteem and grade point average. Peer support was also related to grade point average but conversely a lack of peer support in classrooms was associated with student depressive symptoms in both contexts. These results demonstrate the role that teachers play in fostering not only teacher-student relationships in the classroom but also student-student relationships. The teacher role in developing relationships is an important contributor to the socioemotional climate of the classroom and therefore to the class climate.

Teacher-student relationships early in schooling appear to have long-term implications for future teacher-child relationships. In a longitudinal study, Hamre and Pianta (2001) showed that kindergarten teachers' perceptions of student conflict

and over-dependency were associated with academic outcomes throughout elementary and middle school. The quality of the teacher-child relationship in kindergarten was an even stronger predictor of behavioral outcomes at Grade 8 than was the association with academic outcomes. Hence, negative relational styles of early grade teachers appear to be strong predictors of subsequent behavioral problems and can lead to long-term consequences for students.

EXAMINING TEACHERS' BELIEFS MORE CLOSELY

The beliefs of teachers seem to affect both the instructional and socioemotional climate of classrooms through the behaviors that teachers display. Variation in teacher behavior and practices appears to be associated with particular teachers' beliefs which moderate teacher practices. Specific teacher psycho-social beliefs have been investigated within the literature and been shown to contribute to the classroom climate. For example, teachers' self-efficacy beliefs, goal beliefs, teachers' beliefs about differentiation, and expectations have been shown to contribute to the ways that teachers structure their classrooms and the environment that results. The remainder of this chapter will examine teachers' beliefs in relation to teacher-efficacy, goals, differentiation, and expectations in turn, and discuss the influence of varying perspectives on the classroom climate.

Teacher Self-Efficacy Beliefs

Teachers' sense of efficacy refers to belief in one's ability to teach students effectively and to positively influence their learning (Tschannen-Moran & Woolfolk Hoy, 2001). While the relationship between teachers' efficacy and the socioemotional climate does not appear to have been investigated, there is clear evidence of ways in which teachers' sense of efficacy can influence the instructional context. Woolfolk Hoy, Hoy, and Davis (2009) have argued that teaching-efficacy affects teacher behaviors and pedagogical decision-making which, in turn has direct, indirect, and relationship repercussions for teaching.

Woolfolk Hoy et al. (2009) reviewed the literature and identified some of the direct effects on instruction, and therefore the instructional climate, of having a high sense of teaching efficacy. For example, they reported that in comparison to low efficacy teachers, high efficacy teachers plan more carefully for lessons, effectively consider the organizational framework of the classroom, and demonstrate more successful classroom management skills. High efficacy teachers also monitor student behavior closely and redirect student energies if misbehavior creeps in but they are more likely to use preventive class management techniques rather than admonishing tactics. Similarly, high efficacy teachers are also more willing to experiment with new instructional methods and persist if they find the new techniques difficult provided they can see benefits for learners (Soodak & Podell, 1998).

There are also indirect influences on student learning when teachers have high efficacy (Woolfolk Hoy, et al., 2009). Such teachers are more likely to work closely with struggling students to support their learning, and therefore may enjoy a closer relationship with low achieving students than that of their low efficacy counterparts (Soodak & Podell, 1998). In two separate studies, Soodak and Podell (1998) showed

that high efficacy teachers are generally more able to cater to the needs of low achievers and therefore are less likely to refer them to special education services. Further, high efficacy teachers are more positive in their predictions about student achievement and will adjust their expectations in line with student academic development. High efficacy teachers are also more likely to offer students choices in their learning activities.

Teacher response to student difficulty has implications for the relationships that teachers form with students and therefore the socioemotional climate. Soodak and Podell (1998) showed that one outcome of high teacher efficacy was that teachers are more likely to take responsibility for the learning of struggling students and to adjust their teaching strategies in order to meet the needs of such students. Those with low teacher efficacy were far more likely to refer such students to special education services. Nonetheless, whereas relationships between teacher efficacy and instructional practice have been investigated in many studies, there is a paucity of teacher efficacy research that has investigated implications for teacher relationships and the socioemotional climate. In the only study that could be located, Ho and Hau (2004) found strong relationships between efficacy for instructional strategies and discipline with efficacy for being able to provide students with psychological and emotional support among Australian teachers.

Teacher Goal Orientation Beliefs

Goal orientations are commonly divided into mastery and performance goal beliefs (e.g., Ames & Ames, 1984; Elliot & Church, 1997). Teachers who exhibit mastery goal beliefs believe that students will learn best when teachers emphasize the development of skills and understanding (Midgley, Anderman, & Hicks, 1995). Those with performance goal beliefs consider that students learn best when peer competition and an emphasis on relative grades is encouraged. Teacher goal beliefs have also been shown to influence the ways that teachers structure the instructional context (Anderman, Patrick, Hruda, & Linnenbrink, 2002; Midgley et al., 1995). Following observations in classrooms and student reports of classrooms that were performance or mastery oriented, Anderman and colleagues (2002) provided a summary of how the context and climate of classrooms differed depending on the teacher's goal-orientation beliefs. They reported that low mastery teachers expected students to learn by listening to information, following directions, and behaving well. Low mastery teachers believed that errors reflected a lack of ability or effort. Students could only answer questions when called upon and peer interactions were rare. Praise was limited to students who conformed to procedural directions. In contrast, high mastery teachers viewed learning as an interactive process which required students to be involved and the emphasis in learning was on understanding. Errors were viewed as opportunities to learn and teachers provided support and constructive feedback with a focus on gaining understanding and skills. All students were expected to engage in classroom dialogue and the teachers encouraged all students to contribute. High mastery teachers encouraged students to interact during class activities and to support each other. Praise related to the content of lessons and to students' understanding of concepts.

The socioemotional climate of the classes of low and high mastery teachers also varied (Anderman, et al., 2002). Low mastery teachers appeared to be unenthusiastic

about learning and at times referred to tasks as boring. They did not show confidence that their students could learn and often expressed low expectations of them. They appeared to lack respect for students' academic ability. One low mastery teacher actively discouraged student effort and focused on the form of work (e.g., neatness of handwriting) rather than the content. Students in low mastery classes were often criticized such that the environment in which they were learning was quite negative. These students were given little autonomy but much teacher direction and were actively discouraged from asking questions. In contrast, the high mastery teachers were enthusiastic about lesson content and passionate about learning. Even when students were having difficulty with learning material, the high mastery teachers expressed a view that their students could learn. These classrooms were punctuated by warmth and praise that was "mastery related, clear, contingent, and credible" (Anderman et al., 2002, p. 255). The teachers demonstrated that they had high expectations for their students and consistently provided meaningful feedback. Students were given some choice and freedom in their learning provided they were engaged in their academic activities.

As might be anticipated, teachers with strong performance goal beliefs focused on tests and grades, and in their instructional practice they emphasized students' comparative achievement with others in the class (Anderman et al., 2002). Sometimes the references to comparative achievement were very negative which was likely to affect the socioemotional climate. Conversely, those with weak performance goal beliefs made little reference to relative achievement, tests, or grades.

Teacher differentiation beliefs. I use the term "differentiation" to refer to teachers' beliefs about how students with high and low achievement should be treated. Through interviews with students and teachers and observations in classrooms, Weinstein and her colleagues (Weinstein, 1986, 1989, 1993, 2002; Weinstein, Marshall, Brattesani, & Middlestadt, 1982) have shown that high differentiating teachers believe high and low achievers should be treated quite differently. In contrast, low differentiating teachers believe that all students should be treated equitably. Weinstein has shown that the beliefs of high and low differentiating teachers in elementary schools result in students experiencing quite different learning and socioemotional environments depending in whose classroom the students find themselves. Weinstein (2002) has related the variation in beliefs to six major areas: how students are grouped for instruction, the learning experiences and materials through which the curriculum is delivered, the strategies teachers use to evaluate and assess learning, the motivation structure employed to engage students, the level of autonomy students are given in directing and evaluating learning, and the climate of relationships that are fostered within the classroom. The ways that the climate of the classroom comes to differ depending on teachers' beliefs in relation to these dimensions will be explored below.

In her book, Weinstein (2002) clearly describes how high differentiating teachers believed that students should be divided into and seated in ability groups. The teachers viewed achievement as being the students' responsibility, that is, if the student was struggling it was due to student-centered factors and not to the teacher's instruction. In contrast, low differentiating teachers believed students should sit in mixed ability groupings and that students should support each other. Further, the low differentiating teachers believed that when students did not learn a concept or idea, the teachers needed to take responsibility and plan new ways to develop learning (Weinstein, 2002).

Because high differentiating teachers believed that high and low achievers needed quite different learning activities, there was a highly differentiated curriculum in their classes. The high ability students were provided with additional activities whereas the low ability students were presented with similar low-level repetitive tasks over extended periods because the teachers believed they needed consolidation. The activities which were planned in the classes of low differentiating teachers were quite different. They believed all students should be given similar tasks and that students should work together. The teachers considered that high ability students needed both direction and freedom while low ability students needed teacher support to become more motivated and self-directed so that they would make more rapid learning gains (Weinstein, 2002).

High differentiating teachers believed that intelligence was fixed and therefore that the teacher could have little effect on student achievement. Low differentiating teachers, in contrast, held a view that intelligence was incremental. Student progress was believed to be due to clear direction from the teacher, and appropriate feedback and support from both the teacher and other students. These teachers held a much broader view of ability as being comprised of student capability, work habits, and personality. Further, because the low differentiating teachers believed all students could learn, they encouraged high level thinking from all students (Weinstein, 2002).

High and low differentiating teachers also held discrepant beliefs about how students should be motivated. The high differentiating teachers focused on student performance. They believed that students should be extrinsically motivated with rewards for achievement and performance, in relation to their peers. However, in the classes of low differentiating teachers, the teachers believed intrinsic motivation was more important and so set mastery goals with students. Errors were viewed as opportunities to learn and student self-evaluation was encouraged (Weinstein, 2002).

Another area where the beliefs of high and low differentiating teachers differed was in relation to student autonomy. The high differentiating teachers believed that they should maintain very tight control over students. They also believed students should work independently and only seek help and guidance from the teacher, not from peers. On the other hand, the low differentiating teachers believed that students should view each other as sources of knowledge and help, and that students should be given substantial responsibility for their own learning. Because of their beliefs, the low differentiating teachers fostered a sense of community and collegiality among students with students taking ownership for organizing their groups (Weinstein, 2002).

The socioemotional aspect of the class climate in classes of high and low differentiating teachers also differed, partly as a result of direct interactions with students and partly as an indirect outcome of the teachers' beliefs. In the classes of high differentiating teachers, students were frequently labeled, called names, and threatened. Students who laughed at others were not admonished. There were many public interactions that were negative and at times these involved students being reprimanded for performing poorly. Teachers often threatened students with contacting their parents for non-compliance or below average achievement. In contrast, the low differentiating teachers' interactions with students were characterized by trust and respect and the teachers treated them with dignity. When students' attention needed re-directing, the teachers often included humor in the demand and students were

provided with explanations about why they needed to be doing something different. Parent involvement was encouraged and the teachers showed respect for student cultural diversity. The collaborative nature of the classrooms included parents, other classes, and the school community (Weinstein, 2002).

Teacher Expectations

Teacher expectations are beliefs about the likely future achievement of students taking account of current levels (Rubie-Davies, 2007). Teacher expectations have been frequently investigated, and similar to teacher efficacy and goal beliefs are known to influence student learning and the classroom climate (McKown & Weinstein, 2008). However, with the exception of Babad, Rubie-Davies, and Weinstein, the conception of teachers' beliefs as moderating expectation effects has been infrequently explored.

Most often the research investigating teacher expectations has focused on teachers having high or low expectations for particular students, that is, the concept that teachers will have high expectations for some students but low expectations for others (e.g., Rubie-Davies, Hattie, & Hamilton, 2006). A recent view of expectations portrays expectations as being a teacher-centered construct, a view that reflects the beliefs of teachers in the capabilities of their students (Rubie-Davies, 2008). From this perspective some teachers report high expectations for all their students relative to achievement (high expectation teachers), that is these teachers believed that all of their students could learn beyond their current achievement levels (Rubie-Davies, 2007). In contrast, other teachers have low expectations for all their students, that is, these teachers' expectations for their students' learning were below the students' achievement levels (Rubie-Davies, 2007). In New Zealand, Rubie-Davies, Hattie, Townsend, and Hamilton (2007) identified high and low expectation teachers in elementary schools through surveys in which class level expectations were measured through the aggregation of individual student expectations and compared with class level achievement. High expectation teachers held expectations that were significantly above student achievement at the beginning of the year while the expectations of low expectation teachers were well below student achievement. Further inspection of the data uncovered that when teacher' expectations were significantly above achievement for one group, they were high for all and vice versa. Rubie-Davies et al. (2007) interviewed the teachers about their pedagogical beliefs, observed them teaching, and measured both social and academic outcomes for students in these differing classes. Below I explain how the beliefs and attitudes associated with high and low expectation teachers differ. Further, I present differences in the beliefs and practices of high and low expectation teachers and how these influence the class climate. I also discuss associations between student self-beliefs and academic outcomes in relation to the class context.

Low and high expectation teachers differ in their beliefs related to several key areas. The contrasting beliefs of low and high expectation teachers lead them to organize and teach their students differently (Rubie-Davies, 2008). For example, one salient belief is related to grouping students by ability for core curriculum areas like reading, math, spelling, and written language. All low expectation teachers, in a sample of nine teachers, grouped their students for instruction and learning activities because the teachers believed that they needed to discriminate in the types

of learning opportunities that they provided for high and low achieving students (Rubie-Davies, 2008). This was not the case for high expectation teachers, however, and this was surprising because New Zealand, where the research was conducted, has the highest within-class ability grouping rate of any OECD country (Wilkinson & Townsend, 2000). While some of the high expectation teachers did group their students for instruction (i.e., they taught small groups of students together to develop skills at their level), they did not group their students for learning activities. That is, in high expectation teachers' classrooms students chose the activities that they would complete and who they would work with. At times students completed group activities based on mixed ability grouping. This was because the high expectation teachers believed that all students needed to be challenged and that all students learned best from exciting, fun activities. High expectation teachers were aiming to have self-directed learners whereas the students with low expectation teachers were reliant on the teacher for direction (Rubie-Davies, 2008).

Another area in which high and low expectation teachers differed was in their beliefs about the monitoring of student progress and in the feedback given to students (Rubie-Davies, 2008). Low expectation teachers believed in using testing for summative purposes and monitored student progress less frequently than high expectation teachers. Testing was used for grouping students and recording student achievement. In contrast, high expectation teachers used assessment mostly for formative purposes. They regularly provided students with feedback about their learning, set clear goals with students, and monitored progress towards those goals. The emphasis of testing for high expectation teachers was in providing information about student learning to both teachers and students.

The degree of autonomy given to students in the classes of high and low expectation teachers differed substantially (Rubie-Davies, 2008). Students in the classes of low expectation teachers were given few choices with regard to their learning. Instead, the teachers decided what tasks the students would complete, when, and how they would complete them, and with whom. In the classes of high expectation teachers, however, students were given far more choices. The students chose the learning activities they wanted to work on and the peers they wanted to work with.

At times the high expectation teachers also looked for creative and innovative activities to motivate reluctant learners (Rubie-Davies, 2008). For example, one teacher created math problems based around cricket (a summer team game played with a flat bat and a small, hard ball) for a group of boys who did not like math (Rubie-Davies, 2008). As a result they enthusiastically engaged in solving challenging problems that supposedly were well in advance of their math level. Indeed, several of the high expectation teachers believed that student engagement could be enhanced by incorporating student interests into their learning experiences because they believed such activities were motivating for students (Rubie-Davies, 2008).

How high and low expectation teachers viewed their students' attitudes to school has also been examined (Rubie-Davies, 2010). The primary level New Zealand teachers in this investigation included six high expectation teachers (two from low socioeconomic status schools) and three low expectation teachers (one from a low socioeconomic status school) identified in previous research (i.e., Rubie-Davies, 2006, 2007, 2008). These teachers rated their students' perseverance, independence, reaction to new work, interest in schoolwork, cognitive engagement, participation

in class, motivation, confidence, self-esteem, classroom behavior, peer relationships, teacher relationships, parent attitudes, home environment, and homework completion (Rubie-Davies, 2010). On every one of these scales, the high expectation teachers rated their students more positively than did the low expectation teachers. There was also a strong relationship between the expectations of the high expectation teachers and their ratings of student attitudes. Thus, the high expectation teachers had very positive beliefs about their students that mirrored their positive expectations, a possible halo effect. The picture was different for low expectation teachers, however. While their expectations were low, and their attitudes towards their students more negative than those of the high expectation teachers, for some ratings, low expectation teachers' beliefs about their students' attitudes were more positive than their expectations. The low expectation teachers did appear to believe that their students put effort into their schoolwork (interest in schoolwork and motivation), were well-behaved (classroom behavior), and related well to others (peer and teacher relationships), even though their expectations that their students would make positive learning gains were low. This possibly suggests that the low expectation teachers held a fixed view of intelligence; they believed students would not achieve particularly well, even though they acknowledged that the students worked hard (Rubie-Davies, 2010).

Classroom observations of high and low expectation teachers revealed other differences that largely reflected the beliefs teachers had previously espoused (Rubie-Davies, 2007). For example, across several lessons Rubie-Davies (2007) reported that high expectation teachers made far more statements related to developing student understanding than low expectation teachers. High expectation teachers, more so than lows, spent time orienting students to lessons and discussing what the students would be learning. Also more frequently than low expectation teachers, high expectation teachers ensured they linked current learning to prior knowledge or to previous lessons. The high expectation teachers also provided students with feedback related to their learning far more frequently than did low expectation teachers. Questioning was another aspect of instruction where there were differences between high and low expectation teachers. High expectation teachers asked significantly more questions of students than did low expectation teachers and notably asked far more open questions designed to challenge students' thinking and develop understanding. There were also differences between the two teacher groups in the ways that they responded once students had answered questions (Rubie-Davies & Peterson, 2011). High expectation teachers, more than low expectation teachers, praised students for their correct answer, provided students with feedback about their response, and questioned students further to promote student thinking. Interestingly, the only category in which low expectation teachers interacted more with students than high expectation teachers was in relation to procedural directions. Low expectation teachers frequently reminded students of routines and procedures whereas high expectation teachers had set routines in place early in the year and so trusted students to enact what had been agreed.

A final area in which there were observed differences was in the ways in which the high versus low expectation teachers managed student behavior (Rubie-Davies, 2007; 2008; Rubie-Davies & Peterson, 2011). While there were no differences between the two groups in the numbers of negative behavior management statements made to students, the high expectation teachers far more frequently handled

behavior positively than did low expectation teachers, which meant that students with low expectation teachers experienced more negativity than did those with highs (Rubie-Davies, 2008; Rubie-Davies & Peterson, 2011). Overall, in line with the beliefs high expectation teachers had expressed, they appeared concerned to develop student thinking and understanding, to challenge students (Rubie-Davies, 2008). High expectation teachers also provided students with clear feedback about their learning, used questioning designed to extend and challenge student thinking, and managed students effectively and mostly positively (Rubie-Davies, 2008; Rubie-Davies & Peterson, 2011). On the other hand, the low expectation teachers appeared more concerned with students following directions and responded negatively when there were any infractions (Rubie-Davies, 2007, 2008).

The beliefs of high and low expectation teachers and the instructional practices that resulted from these beliefs could arguably be said to have contributed to differing socioemotional environments for students depending on the type of teacher with whom they were placed (Rubie-Davies & Peterson, 2011). In the classes of low expectation teachers, differences in ability were made salient through the grouping of students and differentiation of learning activities. Differences in ability were far less palpable in the classes of high expectation teachers. Further, while there were few group changes in the classes of low expectation teachers, group changes were common in the classes of high expectation teachers. Taken together, Rubie-Davies and Peterson (2011) suggested that these practices would have contributed to quite different socioemotional climates with that of low expectation teachers being related to competition and of high expectation teachers being associated with cooperation and collaboration.

Moreover, the beliefs and instructional practices of high expectation teachers meant students had ownership of their learning, some autonomy and clear learning goals (Rubie-Davies, 2007). It would seem that these practices probably encouraged a mastery goal orientation since student goals were individualized and students were encouraged to monitor their own progress. In comparison, the provision of differentiated activities for students of low expectation teachers, over which they had no choice and a lack of individual goals to provide students with a focus on what was to be achieved next, suggests the focus in these classes was on comparing groups and thus a performance orientation (Rubie-Davies & Peterson, 2011). Research has shown that students are very mindful of the ability group in which they find themselves (Linchevski & Kutscher, 1998) and it seems probable that this may influence student beliefs about their ability. In contrast, when the focus is on students' learning, when students believe that their teacher respects them, and when mistakes are viewed as learning opportunities, this results in a more positive socioemotional climate (Rubie-Davies & Peterson, 2011), and these behaviors were identified with high but not low expectation teachers.

Similarly, high expectation teachers implemented a range of strategies in order to motivate students including incorporating activities that reflected student interests (Rubie-Davies, 2008). They articulated reasons for their pedagogical decisions which linked the value of student motivation to improving learning (Hidi, 1990; Reeve & Jang, 2006). Because low expectation teachers were more concerned with students following their directions and completing teacher set and designed tasks, they did not encourage self-motivation (Rubie-Davies et al., 2007). Again, it is likely

that these differing beliefs and practices of teachers influenced the class climate, with the former being an exciting, challenging environment with enthusiastic students, something that may not have been so common in the classes of low expectation teachers (Rubie-Davies & Peterson, 2011).

In the classes of both groups of teachers, students were able to work with their peers (Rubie-Davies, 2008). However, in the classes of low expectation teachers, because students were in ability groups for both instruction and learning experiences, they mixed almost exclusively with their same ability peers. This resulted in quite disparate groups of students within the classrooms. On the other hand, the students of high expectation teachers worked in mixed ability groupings and their seating groups changed regularly. This meant that students had the opportunity to benefit from constructive peer modeling (Stone, 1998). A further advantage was that all students had the opportunity to work with all others and the result was a cohesive class atmosphere in which students supported each other, rather than islands of students working in isolation (Rubie-Davies & Peterson, 2011).

Many of the differences in instructional practices outlined earlier between high and low expectation teachers, would also likely have contributed to differing socioemotional climates. For example, the way in which high expectation teachers emphasized understanding among their students, carefully scaffolding their learning and monitoring learning would be likely to lead to students feeling confident and capable about completing tasks (Rubie-Davies & Peterson, 2011). This is in comparison with students in the classes of low expectation teachers where little time was spent introducing and explaining new concepts or in checking student understanding (Rubie-Davies, 2007). Hence, for the students in these classes, they may have been confused and very likely did not feel well prepared for completing activities. Similarly, because the students with high expectation teachers had clear learning goals and received frequent feedback about how they were going in relation to their goals and where to next, they were far more likely to understand the learning process and recognize where their learning was leading (Rubie-Davies & Peterson, 2011). Interestingly, this resulted in students who were less dependent on the teacher, rather than more (Rubie-Davies & Peterson, 2011).

The questioning of students may also have led to differences in the climate of the classroom (Rubie-Davies & Peterson, 2011). Because the high expectation teachers asked many questions to extend student thinking, asked them of all students, and scaffolded students to an answer when they were unsure, these students would probably have felt supported and positive about answering questions. The strategy of the low expectation teachers to ask closed questions almost exclusively meant that most responses by students were either right or wrong. Unlike the high expectation teachers, when students in the classes of low expectation teachers made an error, the teacher either asked another child or told the students the answer herself (Rubie-Davies & Peterson, 2011). This may have had the effect that students would feel less confident about answering questions unless they were certain of the answer.

A final area in which Rubie-Davies and Peterson (2011) suggested that the practices of high and low expectation teachers differed and affected the socioemotional climate was in the way in which the teachers managed student behavior. High expectation teachers managed behavior much more positively than low expectation teachers, often using statements designed to prevent bad behavior such as praising

students who were working well. Low expectation teachers tended to react negatively when poor behavior occurred. Because the high expectation teachers were very positive towards students, it is possible that the climate of the classrooms was warmer with these teachers.

Indeed, testing of students (Rubie-Davies, 2007) suggested that those with high expectation teachers were making much greater academic gains ($d = 1.01$) than those with low expectation teachers ($d = .05$) and across one year, the self-concept of high expectation teachers' students in reading and mathematics rose slightly while that of those with low expectation teachers fell significantly (Rubie-Davies, 2006).

CONCLUSION

This chapter has shown that the beliefs of high efficacy, mastery oriented, low differentiating, and high expectation teachers show commonalities. The shared beliefs are summarized in Table 15.1. These are beliefs that appear to provide the framework for a positive and effective classroom context in which learning occurs at an accelerated rate. They are also beliefs which appear to result in positive teacher-student and student-student relationships such that a warm, cohesive class climate is fostered. As can be seen, the beliefs of teachers that appear to positively affect the class climate and the class context are related to eight key areas: beliefs that high-level student thinking should be fostered, beliefs that mixed ability groupings are an effective way for students to learn, beliefs that all students can learn, beliefs that teachers should provide high levels of support and feedback centered

Table 15.1 Key Teachers' Beliefs by Teacher Type and Resulting Instructional and Socioemotional Practices

Key Beliefs	High efficacy teachers	High mastery teachers	Low differentiating teachers	High expectation teachers
Student high level thinking should be developed	Challenging learning experiences	Focus on student understanding Praise for understanding	Focus on student understanding High level thinking encouraged Clear learning explanations Challenging learning experiences	Focus on student understanding High level questioning Extended learning explanations Challenging learning experiences
Students learn better in mixed grouping	Implement group work		Mixed ability grouping Variety of grouping All students complete similar tasks Frequent group changes Classroom community	Mixed ability grouping Variety of grouping All students complete similar tasks Frequent group changes Classroom community

(Continued)

Table 15.1 (Continued)

Key Beliefs	High efficacy teachers	High mastery teachers	Low differentiating teachers	High expectation teachers
All students can learn	Confident all students can learn High expectations	Confident all students can learn High expectations	Incremental notion of intelligence Success due to student effort High expectations	Challenging activities for all Clear learning goals for all High expectations
Students need teacher support and feedback	Teacher support for learning	Teacher support for learning Constructive feedback focused on learning	Teacher support for learning Positive, constructive feedback	Teacher support for learning Constructive feedback about learning
Students need autonomy and peer support should be encouraged	Student choice	Student choice Student interaction encouraged Student support expected	Student choice Student interaction encouraged Student support expected Student cooperation fostered	Student choice Student interaction expected Student support expected Student cooperation fostered
Students need to cognitively engage in learning	Students engaged in learning Challenging strategies that support learning Innovative methods to support learning	Students involved in learning Learning is interactive All students contributing to class dialogue	Substantial responsibility for learning Activities based on student interest Variety of strategies to support learning	Self-directed learners Challenging activities Activities based on student interest Innovative methods that support learning
Students learn and are motivated by developing their individual skills	Mastery goal beliefs	Mastery goal beliefs Errors viewed as opportunities to learn	Mastery goals Errors viewed as opportunities to learn Fostered intrinsic motivation Evaluation of own work	Clear mastery goals Errors viewed as opportunities to learn
Teachers are socializers and facilitators	Support socio-emotional well-being	Warm, enthusiastic, passionate	Trust, respect, treated with dignity, humor	Warm, positive, supportive, encouraging, fostering high self-esteem
Class organization and management should contribute to increasing learning time	Efficient classroom organization Effective class management Monitor behavior, redirect Preventive management strategies		Positive behavior management	Manage students effectively Positive behavior management Preventive management techniques

around learning, beliefs that student autonomy and support for peers should be encouraged, beliefs that student cognitive engagement levels should be high, mastery beliefs, beliefs about the kinds of teacher attitudes that nurture learning and a positive class climate, and beliefs in the importance of class organization and positive management.

There are two potentially feasible explanations for the convergence of teachers' beliefs that appear to influence student learning. First, it may be that researchers have simply examined how teachers' beliefs can influence the instructional and socioemotional environments of the classroom from different theoretical standpoints and that each of these lead to the core beliefs above that appear to be influential in enhancing student learning and promoting social and emotional functioning. However, a more likely scenario is that one set of beliefs influences the other. Teachers with high efficacy use mastery goals to focus student learning because they believe that all students can learn. Because they have high teaching efficacy and understand the progress that students can make using mastery goals, they also have high expectations for all their students. Further, because they have confidence in their ability to make a difference to the learning of all students (efficacy), set mastery goals which are individualized, and have high expectations for all students, then their focus is likely to be on their teaching and how to improve learning, rather than on student differences that might influence learning (differentiation). There is some evidence for this theoretical stance. Recently, Rubie-Davies, Flint, and McDonald (2012) found associations between teachers' efficacy beliefs and having a mastery goal orientation. The convergence of findings from various theoretical standpoints is exciting as these particular beliefs appear to be important for student social and academic outcomes and are worthy of future investigation.

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16

TEACHERS' BELIEFS ABOUT ASSESSMENT

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“Assessment provides a key interactive context for the struggle for power in the classroom” (Torrance & Pryor, 1998, p. 82) and may be appropriated for learning, or, more negatively, for social control in order to ensure conformity to external expectations, especially the demands of curriculum coverage and classroom management.

(James & Pedder, 2006, p. 116)

The ability to appropriate assessment for social control is evident across national boundaries where high-stakes assessment practices are employed to control learners, teachers, and schools. The use of assessment for such purposes has been widely criticized, yet the practices continue and seem to expand (Nichols & Berliner, 2007). At the classroom level, motivational researchers have warned against the use of competition and external reinforcement as part of assessment practices as these approaches support a performance goal structure and garner negative effects for students' intrinsic motivation (e.g., Ames & Archer, 1988). The potential negative consequences of assessment practices combined with its ubiquitous nature in K-12 schools suggests that there are potentially a variety of beliefs that teachers may hold about assessment, that in conjunction with other beliefs and contextual influences, may influence the practices they employ in the classroom. Certainly, these beliefs will filter how preservice and practicing teachers interpret information about new approaches to assessment and frame their curriculum design and lesson planning (Fives & Buehl, 2012). It is with these concerns in mind that we undertook this investigation of the empirical research on K-12 preservice and practicing teachers' beliefs about assessment.

BELIEF TERMINOLOGY IN THE FIELD OF EDUCATIONAL ASSESSMENT

Nespor (1987) theorized that beliefs reflect an (1) existential presumption (i.e., personal truths that are incontrovertible and unknown to the individual), (2) alternative perspective to experience reality (i.e., what *should be* rather than what *is* perspective), (3) affective and evaluative components (i.e., guided by feelings/judgments rather than rationality/logic), and (4) episodic rather than semantic structure. Further, belief structures or systems refer to the set of beliefs individuals (collectively or individually) hold about a particular topic (Pajares, 1992). Although some research on teachers' beliefs has longer traditions of study (e.g., personal epistemology, self-efficacy, and specific content domains such as science and mathematics) and have more clearly delineated the constructs of knowledge and beliefs, researchers of teachers' assessment beliefs use varied subsuming terminology such as "conceptions" (as described by Thompson, 1992) and "values" to describe variables of interest.

Thompson (1992) described conceptions "as a more general mental structure, encompassing beliefs, meanings, concepts, propositions, rules, mental images, preferences, and the like" (p. 130). Essentially, the concept of a conception subsumes knowledge and belief into a singular construct and provides a framework for describing teachers' overall perception and awareness of assessment (in this case). Brown and colleagues, for example, have established a strong multinational line of research focused on teachers' conceptions of the purpose of assessment (e.g., Brown, 2004, 2006; Harris & Brown, 2009). Similarly, the term "value" is also used to describe teachers' assessment-related beliefs. James and Pedder's (2006) instrument, for example, is designed around a set of theoretically identified assessment *practices* and beliefs, measured in terms of how much teachers *value* each practice. The focus of research in this area seems to be examining the gap between teachers' frequency of use and beliefs about the importance of each practice. Thus, for the purposes of this chapter we use the terms conceptions and values (as used by the original authors) to capture teachers' assessment beliefs.

METHODOLOGY

Peer-reviewed, empirical articles on preservice and K-12 practicing teachers' beliefs about assessment published after 2000 (except for a few seminal pieces, e.g., Webb, 1992) and written in English were included in this review. Theoretical manuscripts, dissertations, and conference papers were excluded. The focus of our review is on teachers' beliefs about assessment; we therefore excluded manuscripts that measured the relationship between teachers' beliefs and feedback. Due to space limitations, some beliefs were considered outside the scope of this review including beliefs about assessment of (1) students with special needs, (2) teachers and value-added models, (3) preschool education, and (4) specific academic (e.g., science) and non academic (e.g., socio emotional) content when the content specificity overshadowed the assessment belief research.

We engaged in several strategies to identify a pool of empirical articles for inclusion. First, we performed searches in Google Scholar, Academic Search Premier, ERIC, Psych Info, and PsychArticles using a combination of the search terms: assessment,

beliefs, conceptions, values, and teach*. We read titles and abstracts to identify the articles that met our inclusion criteria and those that were relevant were pasted into a Word document. The document was organized and checked to eliminate any redundancy. Second, we reviewed the table of contents for the following journals: *Teaching and Teacher Education*, *Assessment in Education: Principles, Policy and Practice*, and *Educational Measurement: Issues and Practice* from 2000 to present to identify articles missing from our previous searches. These titles/abstracts were added to the document. Lastly, we re-read each abstract to ensure that each article met the inclusion criteria. This resulted in 28 empirical articles that met our inclusion criteria.

CHAPTER OVERVIEW

The purpose of this chapter is to overview the research on teachers' beliefs and conceptions about assessment.¹ We start by examining the research on teachers' beliefs and conceptions about the purposes of assessment and organize these research findings along a continuum of purposes from pedagogical to accounting. In the next section, we review the research on teachers' beliefs and conceptions about the different forms of assessment including various assessment methods and the use of formative assessment techniques. Because research suggests that understanding the assessment context may help to explain cross-cultural differences in teachers' conceptions of assessment, we review cross-cultural differences in teachers' conceptions of assessment in low- and high-stake accountability contexts. We conclude by presenting the research on the alignment between teachers' beliefs/conceptions and their teaching practices. Findings and implications are then discussed.

BELIEFS ABOUT THE PURPOSES OF ASSESSMENT

We identified five approaches to examining teachers' beliefs about the purposes of assessment (i.e., Brown, 2004, 2006; Davis & Neitzel, 2011; Harris & Brown, 2009; Karp & Woods, 2008; Remesal, 2007). Common across these investigations was the framing of assessment purposes as serving different goals such as learning/teaching goals or goals of accountability (of students, teachers, or schools). These differences were articulated by Remesal (2007) as aligning on a continuum of assessment purposes. The pedagogical end describes assessment as serving to regulate teaching and learning whereas the accounting end is regarded as quantifying results and grading learners and school. We found this continuum to be both theoretically compelling and conceptually pragmatic for evaluating other approaches to measuring teachers' beliefs about the purposes of assessment. Therefore, we used this notion of a continuum of purposes to illustrate the similarities and differences across these investigations.

At one end of the continuum we recognize the extreme pedagogical perspective which focuses on assessment for learning. The opposite extreme reflects assessment used for the sole purpose of high-stakes accountability. Table 16.1 provides an overview of this continuum and the studies included in it. In our analysis of the research in this area we mapped each investigation onto our continuum of purposes. This allocation of purposes was guided by the ways beliefs were articulated by the scholars of the studies we reviewed.

Table 16.1 Continuum of Beliefs and Conceptions About the Purposes of Assessment

Beliefs and Conceptions about the Purpose of Assessment					
Author	Extreme Pedagogical	Assessments' role in teaching	Mixed	Extreme Accounting	Irrelevant
Remesal (2007)	Assessments role in learning	Assessments' role in teaching	Assessments role in the certification of learning	Assessments role in the accountability of students' achievement as indicator of teacher prof ability	
Brown (2004; 2006)	Improves Education -improves learning -improves teaching -is valid	-describes abilities		School accountability Student accountability	Assessment is irrelevant – it's bad, ignored, inaccurate
Harris & Brown (2009)	Joint teacher and student use for individualizing learning Teacher use for individualizing learning Facilitating group instruction		Extrinsically motivating students	External reporting	Compliance
Karp & Woods (2008)	TA: Facilitate learning	TA: Determine where students are with skill & knowledge SA: Show them where they are in relation to goals	SA: <i>Motivate</i>	TA: Show achievement of standards TA: Evaluate teacher effectiveness PA: Inform	
Davis & Neitzel (2011)	TA: Evaluate/ inform instruction TA: Gauge student investment SA: Cover material	TA: Identify student for remediation SA: Generate feedback	TA: Evaluate learning SA: Student accountability	HU: Teacher accountability HU: Prepare for high stakes tests	

SA = Student audience
 TA = Teacher audience
 PA = Parental audience
 HU = "Higher-ups"

The perspectives in this section reflect varied research goals, methodology, and participants. Here we provide a brief overview of each study, and in the sections that follow we describe the findings from each in relation to our continuum of beliefs and conceptions about the purposes of assessment. The majority of work we describe in this section was conducted using qualitative research methodology. Remesal (2007) analyzed the interview transcripts and artifacts from 50 Spanish teachers and through this process identified four dimensions of assessment and mapped them onto a continuum of purposes from pedagogical to accounting. Harris and Brown (2009) adopted a phenomenographic approach to investigate whether Brown's (2004, 2006) model of teachers' conceptions about the purpose of assessment and his resulting instrument adequately assessed the full spectrum of teachers' beliefs about the purposes of assessment. Their participants, 26 New Zealand teachers, were interviewed, and their responses were analyzed for conceptions of the purpose of assessment (Harris & Brown, 2009). The analysis revealed seven conceptions of assessment.

Two investigations in the United States identified conceptions of assessment with respect to different audiences. Davis and Neitzel (2011) conducted a qualitative investigation with 15 practicing middle school teachers and described teachers' assessment-related beliefs for four different audiences: teachers, students, parents, and "higher-ups" (i.e., state and district level audiences; Davis & Neitzel, 2011, p. 208). Karp and Woods (2008) investigated preservice physical education teachers' beliefs about assessment multiple times (prior to, during, and after implementing a field-based unit) and through multiple sources (i.e., interview, survey, artifacts) during a semester long course in physical education curriculum. These preservice teachers held distinct beliefs about the purposes of assessment for teachers and for students (based on their personal experiences in high school) and these beliefs fall along our continuum of purposes.

Employing quantitative methods, Brown (2004, 2006) has embarked on a long line of research to describe and frame teachers' conceptions of the purpose of assessment. Grounded in the literature on assessment, Brown identified three commonly reported purposes of assessment, namely, assessment is used to: (1) advance teaching and learning, (2) hold students accountable, and (3) hold teachers and schools accountable (Heaton, 1975; Torrance & Pryor, 1998; Warren & Nisbet, 1999; Webb, 1992). In addition to these conceptions of the purpose of assessment, Brown (2004) argued for the inclusion of a fourth conception, that assessment is "fundamentally irrelevant to the life and work of teachers and students" (p. 304). Brown developed a four-factor tool to measure teachers' conceptions of these purposes called the Conceptions of Assessment—III (COA-III) questionnaire (e.g., Brown, 2004, 2006).² Here we describe the four factors he identified in terms of our continuum of assessment purpose beliefs.

Pedagogical Beliefs and Conceptions About the Purposes of Assessment

Conceptions of assessment at the extreme pedagogy end of our continuum included beliefs about the role of assessment in learning (Remesal, 2007). This included the conception that assessment is for the joint use of teachers and students to facilitate learning (Harris & Brown, 2009) and the belief that assessment is an opportunity for students to be exposed to and cover material (Davis & Neitzel, 2011).

Slightly less extreme were beliefs that the purposes of assessment vary by audience, and for the teacher audience, the purpose of assessment is to facilitate learning (Karp & Woods, 2008), evaluate and inform instruction, and gauge student investment (Davis & Neitzel, 2011). In a similar vein, the teachers in Harris and Brown's (2009) investigation indicated that assessment is used by teachers to individualize learning. These functions serve to provide teachers with useful information for making informed pedagogical decisions.

Toward the middle-pedagogy portion of our continuum, we have placed the first factor of Brown's (2004, 2006) COA-III. The first factor is associated with responses that reflect conceptions that assessment improves teaching and learning (Brown, 2004). The items associated with this factor target conceptions of assessment as improving learning and teaching (i.e., pedagogically focused) as well as conceptions that assessment describes abilities (i.e., pedagogically focused but perhaps not as extreme). Additionally, this factor also includes conceptions about the validity of assessment, which Brown (2004) persuasively argued was a prerequisite for conceiving of assessment as improving education. If the results cannot be trusted, then teachers and students cannot use them to improve learning or teaching. Thus, this factor marries notions of formative assessment, diagnostic assessment, and validity under the umbrella belief that assessment improves education. For these reasons we placed this in the middle of our pedagogy section as parts of this factor reflect more or less of an emphasis on the purpose of assessment as extreme pedagogy.

Moving toward the middle of the continuum, but still within pedagogy, we aligned several conceptions of assessment purposes that seemed to suggest a pedagogical goal yet carried an accounting tone. In other words, the assessment was or could be used as evidence to account for teachers' decisions and actions or were used to put students "on notice" with respect to class work. In this section of our continuum, we included conceptions of assessment that focused on the role of assessment in teaching (Remesal, 2007), specifically for facilitating group instruction (e.g., to group students or manage behavior; Harris & Brown, 2009), to diagnose students' progress in acquiring knowledge and developing skills (Karp & Woods, 2008), and to identify students for remediation (Davis & Neitzel, 2011). Teachers also reported conceptions that assessment was to illustrate for students their progress on class goals and to generate feedback.

Mixed Beliefs and Conceptions About the Purposes of Assessment

We aligned some of the conceptions of the purpose of assessment in the center of our continuum because they blended pedagogical or accounting purposes. The alignment of these conceptions towards one end or the other of our continuum would depend on how the assessment was employed in context. For example, in Harris and Brown's (2009) investigation, teachers described assessment as a tool used to motivate students through competition and information. Teachers described assigning scores so students could evaluate their place normatively as well as giving specific positive feedback on key skills. The analysis offered by Harris and Brown (2009) lumped these conceptions of assessment into a singular conception of external motivation, which depending on the actual conception (i.e., to incite competition or

provide descriptive positive feedback) may be seen as a stronger or weaker conception of assessment for student accountability. Similarly, in Karp and Woods' (2008) investigation, preservice teachers identified an extrinsic motivational conception of assessment that emphasized competition and comparison akin to the extrinsic motivation described by Harris and Brown (2009). Thus, this purpose was also categorized in the center of our continuum.

Lastly, teachers in Davis and Neitzel's (2011) research reported that assessment can be used by teachers to evaluate learning and to hold students accountable. These conceptions were considered more central on our continuum because both of these functions suggest a level of assessment that, depending on its interpretation and application, could be used for pedagogical and/or accounting purposes.

Accounting Beliefs and Conceptions About the Purposes of Assessment

At the other end of this continuum are teachers' conceptions of assessment that reflect accounting purposes, that is to make teachers and schools accountable through evaluations of student performance, typically on high-stakes tests. Several of these conceptions aligned with the accountability purpose but were not categorized as extreme instances. Teachers in Brown and Harris's (2009) research, for example, identified reporting to parents as a purpose of assessment. Although the majority of teachers argued that they reported to parents to defend their grading practices or that parents were more interested in comparative information (i.e., accounting purposes), some reporting seemed to suggest a more pedagogical purpose (i.e., to inform parents of their child's needs so that teachers and parents could work together).

Davis and Neitzel (2011) reported a similar function of assessment for the parent audience as that noted in Harris and Brown (2009). For many teachers, assessment was about giving parents the information they wanted, and for others, assessment was about sharing student progress on skills with parents (Davis & Neitzel, 2011). Although this difference in beliefs about the function of reporting to parents suggests assessment may serve pedagogical or accounting purposes, a greater number of teachers conceived of parents as another group to whom they were accountable. Thus, we placed both purposes toward the accountability end of our continuum, recognizing that teachers need to consider their own perspective on this purpose as well as their hypothesis as to how parents perceive this purpose. In Karp and Woods's (2008) investigation, teachers identified two additional conceptions of assessments that aligned with the accountability end of the continuum, yet do not constitute extreme accountability purposes. These included teacher assessments that showed the achievement of standards by documenting student learning and teacher assessments used to evaluate teacher effectiveness.

Several conceptions of assessment were identified as representing extreme accounting purposes. Brown's (2004, 2006) research included two dimensions that reflected conceptions of assessment as serving the extreme purpose of accountability: assessments make students accountable, and assessments make schools accountable. Brown (2004) described the conception of assessment as holding students accountable as including assigning students to groups, assigning grades, or determining entrance to higher educational opportunities. The latter of these purposes reflect assessment as being more on the accounting end of our continuum, but depending

on the nature and context of the assessment in question (e.g., classroom grouping, end of semester grade, high-stakes test for graduation or university admission), this conception could fall closer to or further from the extreme accountability end. Teachers in Remesal's (2007) research reported a similar purpose of assessment. These teachers reported that assessment was used to evaluate student performance and teacher effectiveness.

Additionally, Brown (2004) described the conception that assessment makes schools accountable and can be used to evaluate the extent to which a school uses resources efficiently. This finding was echoed in Harris and Brown (2009) in that teachers conceived of assessment for external reporting purposes; specifically, the use of standardized assessments to provide evidence of school-level success. For instance, one teacher described external reporting as needed for determining how to allocate resources and for evaluating if schools are performing adequately. In contrast, another teacher interpreted the looming accountability of schools leading to school-level manipulation of testing situations and data. We aligned this conception with the extreme accounting end of our continuum as the authors described these responses as focusing solely on school-level resources and potential negative consequences with little indication that assessment used for this purpose could also be pedagogical. However, as with the student accountability conception of assessment, the degree to which responses to these items indicate an extreme perspective may be bound to the context in which teachers work and live.

Lastly, teachers in Davis and Neitzel's (2011) research reported that assessment was used to provide evidence of teacher accountability to the "higher-ups" and to prepare students for high-stakes tests. We aligned both of these with the accountability end of our continuum as teachers reported an understanding that assessments were ultimately used to hold teachers accountable.

Beliefs and Conceptions That Assessment Is Irrelevant

In Brown (2004), teachers identified a conception that assessment is irrelevant to their everyday work. Items associated with this conception reflected a negative perspective of assessment as something that either interferes with teaching and learning (assessment is bad), is conducted but not used (ignored), or provides little useful information because of measurement error, inaccuracy, or lack of precision. Similarly, teachers in Harris and Brown's (2009) research identified a conception of assessment as compliance or conformity to state-mandated legislation, which the authors associated with the COA-III irrelevance factor. Teacher responses focused on the purpose of standardized assessments and then provided reasons as to why these measures should not be used. Thus, as in the irrelevance factor in Brown (2004), the compliance purpose included conceptions of assessment as being inaccurate. Thus, we placed both conceptions of assessment outside of our continuum because if teachers believe that assessment is irrelevant then it cannot (should not) be used for any of the purposes along the continuum. This reflects a qualitatively different perspective on the nature of assessment by providing an explanation for why not to use assessment, whereas the other three dimensions are focused on how assessment is (or should be) used.

BELIEFS ABOUT DIFFERENT FORMS OF ASSESSMENT

Most of the research on teachers' beliefs about the use of various assessment methods suggests alignment with the pedagogical end of our continuum where assessment advances teaching and guides learning. While there are distinctions between preservice and practicing teachers' conceptions of the effectiveness of different forms or methods of assessment, it is clear these tend to be clearly linked to these teachers' varying experience levels. Common across investigations was teachers' beliefs that utilizing formative assessment processes effectively is desirable, but require a level of sophistication found most often in more experienced teachers. More research is necessary to better connect teachers' conceptions about different forms of assessment and teachers' assessment practices.

Beliefs About Assessment Methods

Preservice and practicing teachers hold beliefs about the effectiveness of different forms of assessments (Tittle, 1994). Adams and Hsu (1998) surveyed 269 U.S. elementary math teachers about their conceptions of assessment and found that teachers relied on classroom observations as their preferred assessment method. Very rarely did these elementary school teachers believe that essays were a useful assessment method, which may be reflective of a content area focus. There was some variation in ratings between 1st/2nd grade teachers as opposed to 3rd/4th grade teachers with the latter relying more heavily on homework assignments to assess student understanding. Preservice teachers' conceptions of different assessment types, on the other hand, revealed that they are more likely to rely on traditional, paper-and-pencil assessments because these are the types of assessments they experienced in school (Graham, 2005). Furthermore, their assessments tend to measure low-level knowledge and skills (Wang, Kao, & Lin, 2010).

Wang et al. (2010) used a combination of open-ended questionnaires and pre-post individual interviews to determine 215 Taiwanese preservice teachers' beliefs about assessment during the third year of their teacher education program. Results indicated that participants' conceptions of assessing content knowledge were limited to low-level, regurgitation of information covered in the textbook or during lecture. Few preservice teachers believed it was important to assess application of knowledge, and for those who did, their conceptions remained limited to application of knowledge to solve well-structured as opposed to more authentic, ill-structured problems. Similar findings were noted for participants' beliefs about assessing processes of inquiry with 94% of preservice teachers, indicating that scientific inquiry is best measured by testing students' understanding of the procedures used to complete a laboratory assignment instead of assessing inquiry processes using the highest cognitive levels of analysis, synthesis, and evaluation (e.g., Anderson et al., 2001).

With regard to standardized tests, a survey of 272 Canadian secondary school teachers by Leighton, Gokiart, Cor, and Heffernan (2010) found that teachers believed that their own classroom tests were the most informative assessment

technique they used to measure student learning. Teachers may conceive students' performance on their own teacher-made assessments as more meaningful than standardized tests results because such tests reinforce test-taking strategies (Leighton et al., 2010) instead of furthering learning or instruction (McMillan, 2003; Plake, Impara, & Fager, 1993). Similar results were noted by Stiggins and Bridgeford (1985) who surveyed 228 elementary and secondary school teachers from eight districts in the United States. Teachers reported that they believed standardized tests were time-consuming, not aligned with their curricular goals, and a poor reflection of students' knowledge and skills.

Beliefs About Formative Assessment

Preservice and practicing teachers also hold beliefs about formative (i.e., assessment for learning) practices. In a qualitative study of 13 Canadian elementary school teachers, Thomas, Deaudelin, Desjardins, and Dezutter (2011) found that teachers' conceptions of formative assessment could be classified by time, form, and the role of the actors. With regard to time, teachers conceptualized formative assessment as an integral part of the teaching-learning process, refuting the position that assessment is separate and distinct from teaching. Next, formative assessment should be continuously enacted during the lesson to provide the teacher with real-time information about students' understanding utilizing a variety of informal and formal assessment tools (also cited in Black & Wiliam, 1998; Brown, 2003). Finally, teachers differed in how they conceptualized responsibility for formative assessment. Some viewed this as a shared responsibility with students; however, the majority held more traditional notions equivalent to providing feedback. Of the 13 teachers observed by Thomas et al. (2011), the researchers noted few opportunities for students to engage in self- or peer-evaluation and that formative assessment was primarily teacher-directed. Similar results were noted by Davis and Neitzel (2011), who found teachers to be primarily responsible for formative assessment processes. In general, most teachers believed that the primary purpose of formative assessment was to assist teachers in identifying and diagnosing students' competencies and motivations. Although this illustrated relatively advanced conceptions of formative assessment, many reportedly struggled with implementing formative assessment practices in their classroom routines.

CROSS-CULTURAL DIFFERENCES IN TEACHERS' CONCEPTIONS OF ASSESSMENT

Cross-cultural research suggests that teachers' conceptions of assessment differ across contexts and these differences reflect teachers' internalization of their society's cultural priorities and practices (Brown & Harris, 2009; Brown, Lake, & Matters, 2009, 2011). A systematic line of research on these cross-cultural conceptions was implemented in New Zealand, Australia, Spain, Iran, China, and the Netherlands using Brown's (2008) COA-III (full and abridged versions). When this instrument was translated and administered in various countries, results indicated differing factor structures as well as variation in the pattern and strength of agreement

for each factor. It appears that understanding the assessment context may help to explain cross-cultural differences in teachers' conceptions of assessment noted in the research.

Low-Stakes Accountability Contexts

New Zealand, Australia, Spain, and the Netherlands are considered low-stakes accountability contexts because they require few, if any, compulsory national assessments, and decisions regarding assessment are made primarily at the local jurisdiction or school level (Brown, 2008; Brown, Lake, & Matters, 2011; Brown & Remesal, 2012; Harris & Brown, 2009; Segers & Tillema, 2011). Further, in each of these countries teachers are engaged in classroom assessment using formative and summative practices, and these data are used to make decisions (e.g., placement into secondary school) about students' knowledge and skills. Therefore, it is reasonable to expect that teachers' beliefs about assessment in these countries might reflect the "assessment for improvement" conception to a greater extent than they reflect "assessment for accountability" purposes.

In 2004, Brown examined New Zealand elementary school teachers' beliefs about assessment using the 50-item version of the Teachers' Conceptions of Assessment questionnaire. His findings confirmed that teachers believed assessment is used to improve teaching and learning. Furthermore, these teachers agreed that assessment can be an external measure to hold schools accountable; however, they rejected the notion that assessment is for student accountability purposes and that assessment is irrelevant. These findings are not surprising. In New Zealand, schools determine which assessments will be administered, and teachers use results to assess students' progress on the knowledge and skills put forth in the national curriculum. There are public expectations that schools disseminate evidence of student performance, although these are not state-mandated, and schools have autonomy to determine the manner in which they report this data. Thus, the finding that teachers believe assessments are used to hold schools accountable appears to reflect teachers' understanding of these larger, public pressures.

The assessment context in Australia is arguably similar to that in New Zealand, and therefore it is reasonable to expect teachers would hold similar conceptions of assessment across both contexts. Brown et al. (2011) investigated Australian teachers' conceptions of assessment in Queensland using the COA-III (abridged version) and found that 1,398 primary and secondary teachers agreed that assessment is used for improvement purposes; however, primary school teachers were more likely to cite this as their primary purpose for engaging in assessment compared to secondary teachers. Furthermore, teachers who conceived of assessment as being used to improve teaching and learning were more likely to believe that assessment makes schools accountable. Given these results, Brown and his colleagues concluded that Queensland and New Zealand teachers hold similar conceptions of assessment and that this was a reflection of their similar assessment contexts.

Spain also has a low-stakes accountability system in that no external standardized testing is required at the national level (Brown & Remesal, 2012). To determine whether Spanish preservice teachers hold similar assessment beliefs to New Zealand preservice teachers, Brown and Remesal (2012) surveyed 996 freshman

and sophomore students in their respective teacher preparation program. Using a combination of exploratory and confirmatory factor analysis, results indicated that Brown's (2004) four factor model did not accurately represent preservice teachers' beliefs structure. In particular, it was determined that the irrelevance factor was in fact two separate factors named "Bad" and "Ignore" and that several of the items that assigned to the improvement factor were now assigned to school accountability (Brown & Remesal, 2012). Furthermore, New Zealand preservice teachers were more likely to endorse conceptions of assessment that conceive of assessment for improvement, school accountability, and student accountability purposes, whereas Spanish preservice teachers primarily conceived of assessment as bad. It is important to note that the Spanish sample in this study came from the Catalonia community which was at the time piloting a regional standardized test at the primary school level. Perhaps students' high endorsement of the "assessment is bad" purpose was in response to this recent change in their local context.

Segers and Tillema (2011) investigated teachers' conceptions of assessment and found similarities and differences between Dutch and New Zealand teachers' beliefs. The sample consisted of 351 Dutch secondary school teachers. Results indicated a four factor beliefs model indicating that teachers believe assessment (1) measures student performance and learning; (2) holds schools accountable; (3) is inaccurate, unreliable, and contains measurement errors (i.e., bad quality); and (4) is used to make instructional decisions and measure higher order thinking skills (i.e., good quality). Two of the factors (#2, #3) were conceptually similar to New Zealand teachers' beliefs (i.e., school accountability and irrelevance) and two were not. Factor one combined Brown's student accountability and improvement factors. In Dutch secondary schools, teachers relied on both formative and summative assessment data in their practices, and thus differentiated formative/summative assessment from assessments used for school accountability purposes but did not consider formative and summative assessment as serving distinctly different purposes. This differed from results noted in the New Zealand sample (Brown, 2004). The Dutch sample noted anew factor reflecting teachers' conception that assessment provided evidence for instructional decision-making and measures higher-order thinking skills. Segers and Tillema (2011) attributed this to the recent national debate emphasizing that assessments should measure higher-order thinking processes such as application, analysis, and evaluation rather than rote memorization of knowledge.

High-Stakes Accountability Contexts

Teachers' conceptions of assessment were also examined in high-stakes assessment contexts such as China and Iran (Brown, Kennedy, Fok, Chan, & Yu, 2009; Pishghadam & Shayesteh, 2012). Both countries use public examinations that carry high-stakes for teachers and students. Examination results determine placement into different levels of education and acceptance into high-quality institutions. Additionally, teachers use frequent summative assessments to motivate students and to inform instruction in the classroom. Therefore, teachers' beliefs in high-stakes accountability contexts are hypothesized to reflect endorsement of assessment for student and school accountability purposes.

In a study of Hong Kong teachers' beliefs about assessment, Brown et al. (2009) found that teachers who conceived that assessment makes students accountable were also likely to conceive that assessment can be used to improve teaching and learning. This differed from data collected in the New Zealand sample that indicated a negative correlation between improvement and student accountability purposes. To investigate this further, Brown, Hui, Yu, and Kennedy (2011) examined the beliefs of 1,464 primary and secondary teachers from Hong Kong and Guangzhou, China. Using exploratory and confirmatory factor analysis, teachers' beliefs were conceptualized as a three factor model: assessment for improvement, assessment for accountability, and assessment is irrelevant. Results indicated that teachers from Hong Kong and Guangzhou responded similarly to the survey, and thus hold analogous beliefs. An examination of the inter-correlations among factors indicated that the improvement purpose had a strong, positive correlation with the accountability purpose. This is consistent with Brown et al.'s (2009) finding. Additionally, the irrelevance purpose was weakly and negatively correlated with the improvement purpose, and weakly and positively correlated with the accountability purpose. These findings are not surprising given Chinese policies and practices reinforce examinations as a tool to improve student learning.

Iran, similar to China, is considered a high-stakes assessment system (Pishghadam & Shayesteh, 2012). In an examination of 103 English language teachers employed at private language institutions, the researchers found evidence for Brown's (2004) four factor model of teachers' conceptions about assessment, although the extent to which they endorsed these assessment beliefs differed from the New Zealand sample (i.e., assessment is used for student accountability, assessment for improvement, assessment is irrelevant, and assessment makes schools accountable). Similar to the Hong Kong sample, Iranian teachers' data showed a strong, positive correlation between assessment for improvement and assessment for school accountability purposes. Since both countries have very similar assessment systems, it is not surprising that Chinese and Iranian teachers' beliefs would be similar.

ALIGNMENT BETWEEN BELIEFS AND PRACTICES

Most of the research on teachers' assessment beliefs or conceptions is driven by the view that beliefs influence practices and outcomes (Brown, 2008). Therefore, to alter teachers' assessment practices it is necessary to change teachers' assessment beliefs or conceptions. Few studies identified for this chapter indicated a relation between teachers' assessment beliefs/conceptions and practice; however, some evidence does suggest that a relationship may exist.

Karp and Woods (2008), for example, investigated preservice teachers taking a physical education teaching methods course that included explicit instruction in alternative assessment. In addition to the findings described previously, these researchers also examined the alignment of preservice teachers' assessment beliefs and practices during the planning and implementation of a unit of instruction in a field placement. These preservice teachers indicated a willingness to try more alternative and performance-based assessments than they had experienced as K-12 students; however, when they attempted to implement their envisioned lesson

and assessment plans, a discrepancy between their beliefs and their actions became apparent. Karp and Woods (2008) attributed this to preservice teachers' lack of experience specifically with alternative types of assessment. They also acknowledged that preservice teachers struggle with the complexity of the teaching process in the early stages, which can also contribute to the discrepancy between planning and implementation.

Moreover, Davis and Neitzel (2011) used self-regulated learning as a lens to examine how 15 middle school teachers' conceptualized the purposes and approaches of their daily assessment practices over three years. Utilizing a structured observational protocol to quantify frequency counts of the instructional information, practice, and feedback patterns teachers used, these researchers found that despite teachers' articulated wealth of assessment knowledge and expertise, they rarely prompted students to ask their own questions about their performance or to engage in self-assessment. Teachers indicated that their assessment practices were constrained by external demands for particular kinds of assessment information. These demands pulled them away from more learning focused assessment practices that they reported believing in because their context demanded different practices.

James and Pedder (2006) developed a questionnaire to measure both how often teachers engaged in particular assessment and learning practices (practice measure) and how important each assessment practice was for teachers in their efforts to create learning opportunities (beliefs measure). Analysis of responses from a sample of 558 teachers in England identified three dimensions of assessment and learning practices intended to: (1) make learning explicit, (2) promote learning autonomy, and (3) enact performance orientation across multiple content areas. Examination of the gap between reported practices and beliefs revealed that although these teachers valued the practices involved in making learning explicit and promoting a learning autonomy, they reported engaging in practices that would support a performance orientation in students far more than the other two factors. James and Pedder (2006) attributed these results to the testing context in England at the time of this study that required teachers to push students to perform on tests and consequently required teachers to engage in performance-oriented practices despite their evaluation of these practices as less important.

Similarly, Winterbottom et al. (2008) used James and Pedder's (2006) measure with teacher trainees in the UK engaged in a post graduate certification course. Descriptive analysis suggested that these participants were "doing less than they thought important for enhancing students' learning" (p. 198). Comparison of value and practice across the identified factors revealed similar patterns to James and Pedder's (2006) results for performance orientation (practiced more than valued) and promoting learning autonomy (valued more than practiced). A difference emerged with the making learning explicit factor, in that teacher trainees reported slightly greater levels of practice than value, the opposite of James and Pedder's finding. These differences in value and practices between preservice teachers and more experienced teachers may be reflective of the developing nature of both values and practices in teacher trainees who are still constructing their beliefs and skill base for teaching.

FINDINGS AND IMPLICATIONS

In this section, we look across the major themes of our review and identify key findings that have implications for practice, research, and theory.

First, teachers' assessment beliefs and the structure of those beliefs are shaped by the policies/practices as well as social and cultural priorities in a society (Brown & Harris, 2009). Two sets of research from our review provide initial support for this finding. First, cross-cultural research using the COA-III suggests that understanding the larger, national assessment context can help to explain cross-cultural differences in teachers' conceptions of assessment. Second, Remesal (2007) found that even teachers from similar school contexts and exposed to the same socio-political influences and expectations reflected varied and mixed beliefs about the purpose of assessment. Taken together, these studies suggest the need for further research to examine the structure and nature of beliefs *within* and *across* cultures.

For teacher educators interested in altering teachers' assessment practices, these cross-cultural findings suggest a need to understand the larger social and political assessment context, and how these contexts shape assessment-related beliefs. Moreover, it may be necessary for teacher educators to expose, unpack, and scaffold analyses of these contextual systems and help preservice and practicing teachers understand their assessment beliefs in relation to these current and reform practices before belief change can occur.

Second, the primary construct used to examine teachers' cognitions about assessment is a "conception." Introduced by Thompson (1992), a conception includes teachers' knowledge of, beliefs about, and affect for assessment. However, others have made a theoretical distinction between knowledge and beliefs (Nespor, 1987; Pajares, 1992) suggesting that knowledge claims require a consensus component (i.e., agreement about the truth or falsity of a knowledge claim; Nespor, 1987). When teachers are asked about the purpose of assessment as a conception, the responses garnered may be a reflection of their knowledge perspective (what assessment is in their context) rather than a belief (what assessment should be). The knowledge-belief distinction may indicate different explanations of practice and point towards alternative intervention or educational experiences.

Third, we opened this chapter with a reminder that assessment practices hold power that can enhance learning and democratic practice or can be used to punish and control learners, teachers, and schools. We see these issues as central to understanding teachers' assessment beliefs and practice but investigations into these issues were conspicuously absent from the research we found in this area. Instead the focus has been on the conceptual understanding of the nature of assessment rather than beliefs about power in using assessment for these different purposes. The ethics of assessment practices and teachers' beliefs about those practices is an area ripe for investigation.

NOTES

- 1 Researchers of teachers' assessment beliefs use varied subsuming terminology such as "conceptions" (as described by Thompson, 1992) and "values" to describe variables of interest. Thus, for the purposes of this chapter we use the terms conceptions and values (as used by the original authors) to capture teachers' assessment beliefs.
- 2 We use the same acronym to refer to all versions of Brown's instrument (full and abridged).

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17

CONTEXT MATTERS

The Influence of Collective Beliefs and Shared Norms

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The quality of the instructional activities in a school is shaped, in part, by its context; and while school context is informed by a variety of attributes, in this chapter we focus on teachers' collective beliefs as an integral element of the context that helps to create the normative environment of the school. The behavior of teachers is influenced by their beliefs about the children they serve and their own capability to teach them (Bandura, 1993; Goddard & Goddard, 2001; Goddard, Hoy, & Woolfolk Hoy, 2000; Tschannen-Moran, 2014), and as noted by several of the authors in this volume (e.g., Buehl & Beck, Chapter 5; Skott, Chapter 2), teachers do not develop or maintain these beliefs in isolation. Their beliefs are shaped by interactions with others in the environment in which they work and the collective beliefs that grow out of these interactions. While there are many diverse aspects to these collective beliefs, we explore two that have been found to be strongly related to schools' success at fostering student achievement. These are teachers' collective belief in their efficacy for fostering student learning (Goddard, Hoy, & Woolfolk Hoy, 2000) as well as the belief of teachers that their students and their families are trustworthy (Goddard, Tschannen-Moran, & Hoy, 2001). These two sets of beliefs are related to two strong norms that govern behavior in schools, including the level of academic press as perceived by teachers and students (Hoy, Tarter, & Hoy, 2006; Berebitsky, Goddard, Neumerski, & Salloum, 2012; Tschannen-Moran, Bankole, Mitchell, & Moore, 2013), and the degree of professionalism exercised by teachers, as perceived by their peers (Tschannen-Moran, Parish, & DiPaola, 2006). We conclude by exploring the implications of these findings for school leaders and policy makers.

COLLECTIVE BELIEFS AND NORMATIVE CONDITIONS

Schools are organizations where teachers work together in an interactive social system and the social organization of the school structures the relationships of teachers, administrators, and students in ways that affect instructional activities (Hoy & Miskel, 2012). In contrast to past generations, teachers typically do not work in isolation nor do they have control over the curriculum they teach. Teachers work collectively, not independently, within the school organization to influence the achievement of students in their school, and they are held accountable for outcomes that have been established by policymakers far from their classrooms (Elmore, 2007). Social cognitive theory asserts that teachers' perceptions of both self and organization influence their actions (Bandura, 1993, 1997). The belief systems of faculty result in cultures that can either energize school personnel to work toward organizational goals or that can be detrimental to the attainment of those goals due to the debilitating effect they have on morale and motivation. The beliefs that emerge from the interactive process in schools influence both participants' well-being and what they can accomplish as a group (Bandura, 1993, 1997).

School community members learn to behave according to the manner in which the overall group behaves, and group members evaluate themselves and other members of the group according to the established norms of the environment (Bandura, 1989). These norms produce an interaction between personal, behavioral, and environmental factors, which Bandura termed "triadic reciprocal causation." He contended that persons are neither wholly autonomous agents nor are they simply at the mercy of animating environmental influences. Rather, their behavior is shaped by cognitive, affective, and other personal factors, interacting with environmental events and forces. At the root of Bandura's perspective is the notion that humans have certain capabilities, which include extracting meaning from their environment, setting goals, anticipating, planning, facing challenges, and learning through observing others. He asserted that self-reflection is the most uniquely human of these capabilities. The ability to evaluate one's actions through self-reflection is the most prominent capability in its effect on human behavior, because it determines motivation, effort, and perseverance (Bandura, 1989).

School culture is composed of a set of tacit assumptions and beliefs that have arisen as a group of educators has wrestled with the problems of practice over time, and that has worked well enough to be considered valid and that is consequently passed along to new organizational members as the proper way to think, perceive, and behave (Schein, 2006). As Bandura (1997) noted, "the belief systems of the staff also create an organizational culture that can have vitalizing or demoralizing effects on the perceived efficacy of its members" (p. 248). The functioning of a school is strongly based on the academic and social norms of the organization, including those of the student population (Bandura, 1997; Goddard & Goddard, 2001). Teacher behaviors and actions both influence and are influenced by the context created by these group norms (Goddard & Goddard, 2001). Collective beliefs constitute a powerful factor affecting different arenas of the school organization, influencing attitudes, affective, motivational, and behavioral aspects of teacher functioning within the school.

COLLECTIVE EFFICACY

Teachers' shared attitudes constitute a powerful emergent characteristic of the complex social environment of school. A school faculty's sense of collective efficacy is a powerful communal belief that is related to positive organizational outcomes. Collective efficacy is "the group's shared belief in its conjoint capabilities to organize and execute courses of action required to produce given levels of attainment" (Bandura, 1997, p. 477). Staffs with a high level of collective efficacy firmly believe that they have the capability to foster learning for all students (Bandura, 1993). Whether the faculty perceptions would coincide with the perceptions of an "objective observer" or not, they are the reality the faculty experience and that consequently influences their behavior.

As a shared belief about the joint influence a school faculty can have on student achievement, collective efficacy is the product of the interactive dynamics of the group members (Goddard, Hoy, & Woolfolk Hoy, 2000). It is based on the collective analysis of the teaching task and the assessment of the faculty's teaching competence. These beliefs stem from the enactive and vicarious learning experiences, social pressure, and the emotional tone of the organization. The school environment can affect teachers' belief in their collective efficacy to improve student achievement, and increased student achievement can, in turn, increase teachers' sense of collective efficacy. Collective efficacy beliefs influence student achievement by influencing the effort that teachers invest in instruction as well as their persistence with students who are struggling (Bandura, 1993, 1997; Goddard, Hoy, & Woolfolk Hoy, 2000; Hoy, Sweetland, & Smith, 2002; Tschannen-Moran & Barr, 2004). These differences in the collective beliefs of the faculty help account for the differences in levels of student achievement between schools. Although socioeconomic status (SES) has a powerful effect on student achievement, these studies have demonstrated that when collective efficacy is taken into account, the impact of student characteristics such as SES on achievement is reduced. Thus, low-income students who are educated in a school where the teachers share a strong sense of efficacy perform in ways that are similar to their middle-income peers.

The collective efficacy of a school organization influences how teachers instruct students, manage their classrooms, motivate students, and respond to obstacles and setbacks (Bandura, 1993; Goddard, Hoy, & Hoy, 2000; Tschannen-Moran & Barr, 2004). Just as individual teacher self-efficacy beliefs are predicted to influence the goals teachers set, the effort they invest in those goals, their perseverance in overcoming obstacles, and their resilience in the face of setbacks, so too are these dynamics postulated to play out at the collective level. In schools with strong collective efficacy, teachers are more likely to set challenging benchmarks for students, strive for instructional improvement, and believe their students can reach high academic goals.

Collective efficacy impacts the effort that teachers invest in preparing for and delivering instruction as well as the extent to which teachers persist in finding new instructional strategies for students who are struggling. Staffs with high collective efficacy display resiliency when working with students who are having difficulty improving achievement levels. They provide instruction for students who are below grade level or who are not mastering the skills needed to be successful in school.

The interventions are designed to accelerate learning, to overcome obstacles, and to increase student efficacy and student achievement (Bandura, 1997). Classroom behavior is carefully managed to promote student engagement and achievement. Teachers, as a result, spend less time on behavioral issues and more time on academic instructional issues. Educators in schools with strong collective efficacy, because of their sense of conjoint capability, accept responsibility for their students' academic outcomes. They do not accept poor student achievement as an inevitable byproduct of low SES, lack of ability, or family background. A robust sense of collective efficacy has been linked to stronger teacher commitment to students (Lee, Zhang, & Yin, 2011; Ware & Kitsantas, 2007). Thus, schools with a strong sense of collective efficacy tend to perform better than their less efficacious peers because of a pervasive state of resolve characterized by high expectations for faculty performance that ensures tenacity in the face of obstacles and creativity in response to problems.

Collective efficacy is a group attribute rather than the aggregate of individual teachers' self-efficacy beliefs (Bandura, 1997). Collective efficacy reflects what teachers believe they as a group can accomplish, not what they as individuals can accomplish with the students in their classrooms. Even though they are different constructs, individual and collective efficacy beliefs nevertheless influence one another in reciprocal ways (Goddard & Goddard, 2001). Thus, teachers with a high sense of efficacy in the context of a school with low collective efficacy might find themselves isolated and even ostracized for their perseverant efforts on the part of students. Conversely, a teacher with low self-efficacy might find the resources and motivation to improve if he or she were to teach in a school with a strong sense of collective efficacy. As a group property, however, collective efficacy is much more strongly related to school outcomes than is individual teacher efficacy (Goddard & LoGerfo, 2007).

Given this strong and growing evidence base on the importance of teacher collective efficacy beliefs to school outcomes, it is worthwhile to consider how these beliefs are fostered. Schools that advance a strong sense of collective efficacy have been found to be characterized by high levels of teacher collaboration for instructional improvement that fosters resiliency in the face of challenges (Goddard, Goddard, Kim, & Miller, 2011). Thus the most direct way in which collective efficacy is developed in schools is through structures to promote productive teacher collaboration focused on instructional improvement. In fact, recent research indicates that teacher collaboration is a key form of enactive experience that influences the level of collective efficacy in schools (Goddard et al., 2011; Moolenaar, Slegers, & Daly, 2012).

COLLECTIVE FACULTY TRUST IN STUDENTS AND FAMILIES

In addition to collective teacher efficacy, one of the most powerful of the collective beliefs held by teachers in terms of influencing both their behavior and the collective outcomes of their schools are the beliefs they hold about their students and their families. When teachers hold shared cultural values that result in a high level of trust, teachers are more likely to believe that their students are capable of high levels of learning. They will consequently set higher achievement goals that will result in stronger academic press (Hoy, Tarter, & Hoy, 2006). They are also more likely to work in partnership with families (Henderson & Mapp, 2002).

Faculty Trust in Students

What teachers believe about their students, specifically the degree to which teachers believe that they can trust their students, has an impact on student outcomes. When teachers trust their students, when they believe that their students are respectful, honest, competent, and reliable, they are more likely to create learning environments that facilitate student academic success (Tschannen-Moran, 2014; Watson, 2003). Researchers who have conducted studies in a variety of contexts have consistently found that faculty trust in students makes an important contribution to students' academic achievement in both direct and indirect ways. In a decade-long study of Chicago public schools engaged in reform initiatives, Bryk and Schneider (2002) concluded that trust was a critical factor in predicting which schools would make the greatest gains in student achievement and which would sustain those gains over time. Subsequent studies have confirmed the predictive power of faculty trust in students on student achievement (Goddard, Tschannen-Moran, & Hoy, 2001; Hoy, Tarter, & Hoy, 2006; Tschannen-Moran, 2004). As with the reciprocal causation of collective teacher efficacy and high student achievement, trust too has a tendency to build on itself, so that higher student achievement is likely to produce even greater trust, whereas low student achievement could be expected to lead to a self-reinforcing spiral of blame and suspicion on the part of teachers and students that could further impair student achievement.

A number of factors have been found to influence the level of faculty trust in a school. Statistical analyses of measures that assessed faculty trust perceptions within the elementary schools in an urban district in the Midwest showed that poverty, more strongly than race or ethnicity, hindered the trust that could lead to achievement (Tschannen-Moran, 2001). This finding was echoed in a study of secondary schools in Flanders (Van Maele & Van Houtte, 2009). These findings suggest that when teachers draw in-group and out-group distinctions about students, social class may be a more salient dividing line than ethnicity, and that they perceive greater discrepancy in cultural values across lines of class than of race and ethnicity. Furthermore, the stability of the student body and the proportion of students receiving lunch at free or reduced prices have been found to explain approximately two-thirds of the variance in trust between schools (Goddard, Tschannen-Moran, & Hoy, 2001). This indicates that low SES takes a negative toll on the relationships between teachers and their students and parents.

The powerful role that SES status of students plays as a predictor of student success in schools has been well documented over the past fifty years. Yet, studies of faculty trust in students and achievement have demonstrated a substantial relationship between faculty trust and student achievement, even when the impact of SES was held constant (Goddard, Salloum, & Berebitsky, 2009; Goddard, Tschannen-Moran, & Hoy, 2001; Hoy, 2002; Hoy & Tschannen-Moran, 2003; Tschannen-Moran, 2004; Tschannen-Moran et al., 2013). Goddard, Salloum, and Berebitsky (2009) found trust to be a mediator of the relationship between ethnic composition and poverty, on the one hand, and student achievement on the other. In other words, when the relationship between trust and achievement was considered, ethnic composition and poverty were no longer linked to achievement. This is an encouraging finding because while ethnic and economic factors are out of

the control of teachers and principals, the quality of their social relationships is not. However, teachers' trust of students is related to both ethnicity and poverty, suggesting the importance of confronting teachers' implicit and explicit biases and beliefs regarding students based on their backgrounds.

Researchers have sought to further investigate the mechanisms through which faculty trust in students contributes to stronger student achievement. Trust relationships have been found to be positively related to teachers' orientation toward innovation, collective responsibility, and commitment to the school (Bryk & Schneider, 2002). In addition, faculty trust in students has been correlated with student identification with school (Mitchell, Forsyth, & Robinson, 2008; Mitchell, 2008; Mitchell, Kensler, & Tschannen-Moran, 2012), attendance rates, and the behavior referral rates in schools (Moore, 2010). The strength of these findings suggests that for schools to overcome achievement gaps and to bring about success for all students, they must create conditions that foster faculty trust in students.

Teachers' Collective Beliefs About Families

Although schools typically espouse a disposition of partnership with parents, the culture of schools varies in their stance toward families. Some schools actively cultivate parent involvement, and the collective attitude of teachers and administrators is welcoming and open (Henderson & Mapp, 2002). In these schools, school personnel genuinely believe that families have a valuable contribution to make with regard to their children's education. These schools have in place policies, practices, and traditions that communicate to parents that their involvement and input is valued, and that the school is willing to be flexible in making accommodations around obstacles to that involvement, such as work schedules or the needs of younger children. In many schools, however, although parent involvement is an espoused value, the reality is quite different. In these schools, the tone may be anything but welcoming. Outside of a narrowly proscribed set of behaviors such as helping with homework and attending parent-teacher conferences, parents are seen more of a hindrance to the educational process than a help (Epstein, 1988; Henderson & Mapp, 2002; Mapp, 2004). Moreover, parents may be seen as intruders who interfere with the important work being done in the school, or who think they know more than the educators about how to educate students (Lareau & Horvat, 1999). One study that examined educator beliefs about family involvement documented this discrepancy in espoused versus enacted values, finding significant gaps between the practices educators believed were important and their actual practices (Barnyak & McNelly, 2009). Accordingly to Lareau (1987), social class explains much of the variation among schools in the ways in which they expect parents to partner with them. This explanation is consistent with the earlier finding that trust, which facilitates learning and supports academic press, is often most strained in the poorest school communities.

The collective beliefs of teachers may help to account for the discrepancy between professed values and behavior. For example, when the level of collective trust in parents is high, research has demonstrated more robust outreach to parents, while when trust is impaired, these outreach efforts are likely to flounder (Bryk & Schneider, 2002; Tschannen-Moran, 2001). Teachers with high self-efficacy and schools with

high collective efficacy provide support to parents and seek them out as partners in the student's education (Bandura, 1997). Frequent and productive communication between home and school is established in schools with a strong sense of collective efficacy (Epstein, 1988).

When high levels of collective efficacy and faculty trust in students and parents are present in a school, it is easier to focus collectively on high academic expectations and teachers are more likely to conduct themselves with a high degree of professionalism. These are normative features of school social organization to which we turn next.

NORMS THAT STEM FROM COLLECTIVE BELIEFS OF EFFICACY AND TRUST

Teacher expectations are influenced by their collective beliefs about the capability of both their colleagues and students. When teachers believe that all children can learn, then the rules that govern behavior will create conditions that foster student learning even among students who may be difficult or unmotivated. For example, when teachers take responsibility for student learning, the nature of the informal discourse, such as in the faculty lounge and hallways, will reflect a problem solving tone as opposed to one of blaming students for poor performance. In this section we describe two powerful norms that govern behavior: academic press and teacher professionalism.

Teachers' and Students' Collective Perceptions of Academic Press

Academic press refers to the collective perceptions that there is a clear emphasis on academics in the school and that all students are held to high standards (Hoy, Hannum, & Tschannen-Moran, 1998). In schools with strong academic press, collective beliefs among both teachers and school leaders support a shared confidence in students' abilities, and the belief that all students can reach high academic standards. Stemming from these beliefs, educators create an environment with a strong emphasis on academic achievement where goals and expectations are high and where academic achievement is publicly recognized and honored. In return, students respect the academic norms of the school, look up to their peers who are successful academically, and work hard to meet the high expectations that have been set for them (Hoy & Feldman, 1987; Hoy, Hannum, & Tschannen-Moran, 1998). In these schools, shared norms affect the behavior of students, faculty, and administrators as they adjust their behavior according to the strong expectations for persistent effort and academic success. Teachers hold high expectations that students participate in class, complete homework, and study for exams, and teachers behave in ways that support this high press environment, such as offering students timely feedback, developing challenging and interesting course work, supporting students to meet high expectations, and rewarding success (Goddard, Sweetland, & Hoy, 2000). Students respond positively to the challenge of these goals, and they work hard to achieve them. Thus, a high press environment affects the normative behavior of group members, and the normative behavior presses students to achieve through the effect on their motivation, effort, and perseverance.

A rich body of empirical research has established a relationship between teachers' beliefs and perceptions of academic press and student achievement (Goddard, Sweetland, & Hoy, 2000; Hoy, Hannum, & Tschannen-Moran, 1998; Hoy & Tarter, 1997; Hoy, Tarter and Hoy, 2006; Lee & Bryk, 1989; Lee & Smith, 1999; Tschannen-Moran, Parish, & DiPaola, 2006), and there is an emerging body of knowledge also linking students' perceptions of academic press to achievement (Tschannen-Moran, Bankole, Mitchell, & Moore, 2013). What makes the research findings on teacher perceptions of academic press particularly noteworthy is that these perceptions are strongly correlated to both collective teacher efficacy and faculty trust in students, and this set of variables forms a trifecta of constructs that are among the only school variables in the fifty years since the publication of the Coleman Report (1966) that researchers have found to maintain its predictive value even when controlling for the SES of students. In a relatively new line of research, students' perceptions of academic press have also been found to be potent predictors student trust in their teachers, students identification with school, as well as of achievement (Tschannen-Moran et al., 2013). Adams (2010) went further in examining academic emphasis among families, noting that when an emphasis on academics was in place at home, students were socialized to trust teachers and to work hard in school, which contributed to greater achievement success. Together these findings point to the strong role that normative expectations regarding academics can play in influencing productive behaviors among members of the school community.

Teacher Professionalism: An Outcome and Influencer of Organizational Beliefs

Strong norms related to collective teacher efficacy and trust in students not only influence normative expectations for student behavior but for teachers as well. One of the outcomes of teachers' collective sense of capability and trust in students are the norms that undergird a sense of professionalism. A profession is characterized by members who possess specialized expert knowledge and who pledge their first and primary responsibility to the welfare of those they serve. In addition, members are socialized into standards of practice and professional ethics through a rigorous training and selection process (Darling-Hammond, 1988; Sykes, 1999). Teaching as a profession has been criticized as falling short in the level of rigor and selectiveness of the field, as well as the failure to monitor and sanction those whose conduct falls short of the expectations of the profession (Darling-Hammond, 1988, p. 65).

Schools as professional communities are bound together by a code of conduct and a set of ethics that guide decision making in the service of the needs of clients. Professional community in schools has been characterized as a collective focus on student learning as well as productive collaboration, de-privatized teaching practice, and reflection (Seashore Louis, Kruse, & Marks, 1996). To the extent that teachers are socialized into the norms of the profession, their beliefs, attitudes, and actions are expected to evidence a strong sense of accountability to the shared mission of service to students and their families. Unfortunately, these norms vary across school contexts so that in some schools there is a high degree of professionalism while

in others the level of professionalism is quite low (Tschannen-Moran, Parish, & DiPaola, 2006).

Because the work of teaching is complex and certainty about practice does not exist, professional educators continually seek to discover the most responsible course of action (Darling-Hammond, 1988, pp. 65–66). The quality of teachers' instructional decisions is enhanced by structures and time that allow for collaboration. When they perform as conceptualized, members of the professional learning community continually research best practices to serve their students better, engaging in joint deliberation as teachers pursue data to bolster their decision making regarding how to respond to the needs of individual students (Elmore, Peterson, & McCarthy, 1996; Fullan, 2003). Differences in perspectives among teachers are valued by other members of the community and problems are openly discussed and resolved (Hoy & Sweetland, 2001; Hoy, Sweetland, & Smith, 2002). These processes, in turn, create the conditions that support student learning.

Teacher professionalism refers to teacher perceptions that their colleagues take their work seriously, demonstrate a high level of commitment, and go beyond minimum expectations to meet the needs of students. In schools with a high degree of teacher professionalism, teachers respect their colleagues' competence and expertise. They work cooperatively with one another, are clearly engaged in the teaching process, and enthusiastic about their work (Hoy, Hannum, & Tschannen-Moran, 1998). The collective perceptions of teacher professionalism in a school have been found to be positively correlated with student achievement (Tschannen-Moran, et al., 2006). Moreover, teachers' perceptions of the professionalism of their colleagues have been strongly and significantly related to the level of faculty trust in colleagues. Thus, where teachers trusted one another, they were more likely to report that colleagues exercise professional judgment and demonstrated a commitment to students, and vice versa through a process of reciprocal causation (Bandura, 1997). In schools where teachers did not perceive their colleagues as behaving in a professional manner, they were less likely to trust them (Tschannen-Moran, 2009; Tschannen-Moran & Hoy 1998).

IMPLICATIONS FOR PRACTICE, POLICY, AND FUTURE RESEARCH

Illustrated throughout this chapter, as powerful as teachers' beliefs are in informing their behavior both inside and outside of the classroom, teachers do not come to these beliefs alone. Teachers' beliefs are forged through daily interactions with school leaders, fellow teachers, students, and families. A number of important implications for practice emerge from this recognition. Research that sheds light on the influence of context on teachers' beliefs is useful to researchers in constructing more adequate models of teachers' beliefs, as well as to school leaders who are tasked with creating contexts conducive to teacher and student work. It is critical to understand how principals organize schools, and the work they coordinate to develop a context that leads to a strong sense of collective efficacy, high trust, a steadfast press for academics, and a professional climate. Implications in the realm of policy are also explored.

School Leaders Roles in Fostering Collective Beliefs and Shared Norms

As those most directly charged with fostering the collective context within their schools, school leaders set the tone for the quality of those interactions and thus influence the collective beliefs that stem from them. Leaders play an important role, not only in setting up the structures to support collaboration among teachers, but to articulate and guard the norms to foster a strong sense of professionalism and trust. An emergent body of research has documented the importance of leadership to collective efficacy (Demir, 2008; Dussault, Payette, & Leroux, 2008; Goddard, Hoy, & Hoy, 2004; Goddard et al., 2011; Goddard & Salloum, 2011; Salloum, 2011). To foster productive beliefs about students and parents, as well as among teachers, school leaders need to create a culture characterized by norms that intentionally foster and support positive interactions that lead to positive beliefs. In this way, they establish a culture with a strong press for academics. For example, Berebitsky, Goddard, and Carlisle (in press) showed that leader support for change is key to fostering teacher collaboration for instructional improvement. As explained earlier, these actions by leaders constitute important forms of enactive experience that according to social cognitive theory play an important role in cultivating the collective beliefs of organizational members. Moreover, Goddard et al. (2011) showed that the stronger teachers' reported their principals' instructional leadership skills, the more likely were teachers to report engaging in frequent and formal collaboration around instructional improvement.

Thus, how teachers perceive and respond to the actions and attitudes of their leader will influence their own behavior and attitudes. Principals with strong leadership skills are able to get their staff to work together to overcome difficulties encountered in improving student achievement (Bandura, 1993). Principals who display strong leadership, listen to teachers, and have the skills to empower their staff to develop a collaborative effort to overcome difficulties are more likely to improve student achievement than those without these skills. They create a positive climate in their schools and promote innovative teaching that leads to strong self and collective efficacy beliefs among their faculty (Hoy & Woolfolk, 1993; Newman, Rutter, & Smith, 1989).

Principals can also support improvement through their efforts to develop trusting relationships in their schools. A principal who is trusted can be the glue that holds a school community together; whereas, a principal who is not trusted by faculty can cause teachers to devote their energies to protecting themselves from anticipated harm or redressing ways they have felt wronged (Tschannen-Moran, in press). Teachers who come to believe that their leaders are trustworthy can devote their energies to the teaching task, while those who believe their administrators are harsh and autocratic judges are likely to expend energy in hypervigilance and in taking defensive action to protect themselves from anticipated harm. A growing body of research attests to the potent impact of these contrasting realities on school outcomes. For example, faculty trust in the principal has been linked to healthy and productive school climates; whereas, when faculty distrust the principal, the climate is likely to become closed and dysfunctional (Smith, Hoy & Sweetland, 2001; Tarter, Bliss, & Hoy, 1989; Tarter, Sabo, & Hoy, 1995; Tarter & Hoy, 1988; Tschannen-Moran, 2009, in press; Tschannen-Moran, Parish, & DiPaola, 2006).

Principals win the trust of their faculty partly through their willingness to extend trust, which is evident through openness in communication and in decision making. When principals withhold information from teachers, it evokes suspicion as teachers wonder what is being hidden and why. Openness in decision making, inviting not only teachers' involvement but influence over organizational decisions that affect them, can create the conditions necessary to foster mutual trust between teachers and principals (Tschannen-Moran, 2001). This mutual trust sets the stage for the open flow of information. Teachers who trust their principal are more likely to disclose accurate, relevant, and complete data about problems, as well as to share their thoughts, feelings, or ideas for possible solutions. When high trust allows for candor and the open exchange of information, problems can be disclosed, diagnosed, and corrected before they are compounded. Mistakes are viewed as opportunities for learning and refinement rather than for blame and castigation, resulting in greater openness and honesty in the face of disappointing results. This openness then allows collective problem-finding and problem-solving to characterize the professional dialogue in a school (Hoy & Sweetland, 2001; Tschannen-Moran, 2009, 2014). Schools where trust is high can help avoid rigidity and a "hunkering down" mentality that organizations often fall victim to in the midst of crisis (Daly, 2009). Communication flows more easily and resources are shared rather than hoarded so that they can be allocated in ways that will have the greatest benefit for the survival and flourishing of the organization (Mishra, 1996).

To meet the challenging new standards that have been set for schools, school personnel must go well beyond minimum performance of their duties, and school leaders need to know what is necessary to foster these extra-role behaviors. Schools cannot specify all that is necessary for teachers to do in their contracts, so for schools to function efficiently, teachers must willingly go beyond their contractual duties. Indeed, one of the most potent tactics used by teachers' unions is to call for a "work to rule," meaning that their members will fulfill their contractual obligations but not one minute more. Organizational theorists have asserted that transformational leadership behavior, a leadership style that focuses on inspiring followers to enroll in the collective vision, and in which the leader provides individualized consideration to the needs of followers, will motivate workers to go beyond their formally prescribed job responsibilities and to give their very best to the task (Leithwood & Jantzi, 2000). However, in a study that examined the antecedents of faculty extra-role behaviors, faculty trust in the principal outstripped transformational leadership behaviors as a predictor of organizational citizenship behaviors (Tschannen-Moran, 2003). Transformational leadership behaviors have been presumed to inspire followers to greater citizenship, but there was no significant correlation between those behaviors and the organizational citizenship of teachers in the schools studied when trust was entered into the equation. Belief that the principal was trustworthy emerged as the sole factor in explaining variance in the citizenship behaviors of teachers. This demonstrates the importance of trust to creating the normative cultures that motivate teachers and students to extend themselves and to give their best as school. Likewise, faculty trust in principals has been linked to faculty perceptions of both the professional orientation of a principal as well as the professionalism of their colleagues, suggesting that principals set the tone of professionalism and trust in their buildings (Tschannen-Moran, 2009). Together, the collective beliefs of teachers about their

students, colleagues, and leaders frame a context that has important implications for teacher behavior and for the outcomes their students will achieve.

Policy Issues in Fostering Collective Beliefs

Schools are complex organizations that achieve gains through the systematic and organized work of all members to build instructional capacity. Indeed, a vast literature exists pointing to the importance of professional learning communities and collaboration generally. Given recent emphasis on enhanced teacher collaboration and professional learning communities—nearly ubiquitous in contemporary schools—occasions abound for teachers to collaborate in ways that develop collective efficacy beliefs. For example, teachers have frequent opportunities for interaction with colleagues through staff meetings, grade-level or department meetings, collaboration with specialists (i.e. special education, reading specialist), and general co-teaching and planning with colleagues. The challenge in such meetings is to frame problems as collective and in such a way that teachers view their colleagues as resources when engaging in the creative problem solving characteristic of collectively efficacious organizations. The goal is to evolve a space where teachers see themselves and their colleagues as capable of bringing about change. Such work supports groups working through problems of practice, thereby enhancing collective efficacy beliefs.

Yet, current accountability policy ignores the complex dynamics of organizational learning and instead focuses on the individual. Contemporary education policy has shifted from school accountability to holding individual teachers accountable for student achievement. Current efforts aimed at teacher evaluation, putting little emphasis on school-wide results, conflict with our knowledge of teacher collective beliefs. This chapter illustrates that policy makers must not lose sight of the importance of the collective—and consider ways to incentivize teachers' collective work as opposed to creating conditions that foster competition amongst colleagues. That said, not all collective approaches to improvement will work either. For example, one recent experiment in this regard was the New York City School Wide Bonuses program, which, despite offering average per teacher bonuses of \$3,000 based on collective performance, was found by Marsh et al. (2011) to *not* influence student achievement and to be generally un-motivating for teachers. One reason for this finding may be that teachers place more value on the quality of social relations in their schools than financial motivators. The challenge for policy makers, then, is to invest in policies that strengthen social relations and provide the types of daily enactive and mastery experiences known to build collective efficacy beliefs. For example, if instructional leadership promotes teacher collaboration around instructional improvement, then policies that invest in the improvement of school leadership may be more likely than merit pay schemes to develop conditions that actually improve schools.

Furthermore, because teachers' beliefs are most pliable early in their careers, it is important to be attentive to the collective beliefs in which prospective and novice teachers are immersed (Bandura, 1997). Novice teachers who start their careers in negative cultures may experience long-term negative efficacy belief deflections (Tschannen-Moran & Woolfolk Hoy, 2007). Thus, teacher educators should be attentive to the school contexts in which they place student teachers and should provide preparation that fosters coping with school environments that do not yet possess

the leadership and teacher collaboration required to create high levels of collective efficacy (Imig & Imig, 2006). Indeed, teacher self- and collective efficacy beliefs as well as the dynamics that make for trust deserve a place in preparation programs for both prospective leaders and teachers. To fully understand such phenomena, further studies that map changes in individual beliefs of novice teachers in relation to the collective beliefs in their school contexts would be helpful in constructing better support to teacher candidates.

Directions for Future Research

While there is growing consensus about the importance of teachers' beliefs and a recognition that these beliefs are influenced by the collective contexts in which teachers work, we need to understand more about how these forces work. What are the factors that contribute to productive collaboration? How do these collective beliefs map onto instructional practices? Positive changes require profound and significant improvements in professional learning and everyday practice. Leaders who create the structures and processes required for instructional improvement tend to build better results over time than those who do not (Goddard et al., 2011). There are lessons to be learned from school learning environments with strong collective beliefs despite challenging contextual conditions. It would be useful to study how leaders cultivate collective efficacy, academic press, teacher professionalism, and trust in students and parents in contexts that include linguistic and cultural differences, as well as disparities in SES. We also need to know more about how to foster contexts that promote student engagement, self-efficacy, and achievement as well as teacher commitment and retention.

There is often a gap between perceptions of principals and those of teachers in matters such as the level of academic press or trust in schools (Hoy & Tarter, 1997). It is not a question of which of these perspectives is "valid" in the sense that it would be confirmed by an outside observer. What is important is that these perceptions, for good or for ill, influence the behavior of those who hold them. We would do well to acknowledge the potential for discrepancies and put in place processes for learning about and from these varying beliefs, processes such as 360 evaluations in which peers and subordinates contribute information to an evaluation, not solely the supervisor, as well as focus groups led by external facilitators who can create safe spaces for sharing. In the end, teachers' perceptions win out because their beliefs guide their behavior. Attention to these collective beliefs will serve scholars, practitioners, and policy-makers alike.

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Section V

Teachers' Beliefs About Knowing and Teaching
Within Academic Domains

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18

PERSONAL EPISTEMOLOGIES AND TEACHING

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Over the last three decades, a growing body of research related to epistemic beliefs has been identified as crucial for understanding teaching and learning (Yadav, Herron, & Samarapungavan, 2011). In particular, research related to beliefs about teaching, learning, and knowledge has been considered important for understanding why teachers engage in certain approaches to pedagogy, curriculum, and assessment in classrooms (Strømsø & Bråten, 2011). The beliefs held by teachers about knowledge and knowing, otherwise known as personal epistemology (Hofer, 2010), have been shown to influence other knowledge and beliefs (Schommer-Aikens, 2004). Fives and Buehl (2012) indicated that “because an individual’s understanding of reality is always seen through the lens of existing beliefs, the role of beliefs as a filter is particularly relevant in the context of teacher education. That is, if beliefs influence how individuals interpret new information and experiences, preservice and practicing teachers’ beliefs shape what and how they learn about teaching” (p. 470–480). It is likely that such beliefs have an important relationship with teacher knowledge and practices.

Research related to personal epistemology has tended to take place in academic contexts (Schraw & Sinatra, 2004), and over the last four decades, a growing body of evidence shows that personal epistemologies influence learning approaches and learning outcomes. However, we know very little about how teachers’ personal epistemologies impact on teaching (Hofer, 2010; Kang, 2008) and teacher education (Feucht, 2009). This is important because teachers’ personal epistemologies are likely to affect student learning (Hennessey, Murphy, & Kulikowich, 2013) by influencing how teachers construct and enact teaching. Hofer (2010) argued that we need further research that investigates the relationship between personal epistemology and teaching, with a focus on how teachers’ personal epistemologies are influenced by broader social and cultural contexts. Such beliefs are important to consider in the context of teacher education as we work toward the support of quality teaching outcomes for teachers and, ultimately, the children for whom they will have responsibility (Yadav et al., 2011).

DIFFERENT TERMINOLOGY AND TRADITIONS IN PERSONAL EPISTEMOLOGY

There is a general consensus that personal epistemology broadly reflects a set of individual cognitions about knowing and knowledge (Pintrich, 2002). Mercan (2012) described such cognitions as “the mental states in which a person holds a proposition about knowledge and knowing to be true” (p. 1412). Briell, Elen, Verschaffel, and Clareabout (2011) argued for the use of the term *epistemological beliefs* as this “would thus refer to the abstract beliefs of lay folk that address questions relevant to professional epistemologists, typically about the nature of knowledge and knowing.” (p. 17). By using the term *epistemological beliefs*, Briell et al. suggest that it is possible to address a range of cognitions that are epistemological in nature (e.g., reflections, judgment, beliefs) and also make use of a term that is already commonly used in the field.

Conversely, Murphy, Alexander, Greene, and Hennessey (2012, p. 476) argued for the use of the term *epistemic beliefs* because epistemological beliefs, they argue, “are beliefs about the field of epistemology, or beliefs about the study of knowledge . . . to say that a person has a personal epistemology or epistemological beliefs is akin to making the person an epistemologist.” This stance is also supported by Hofer and Bendixen (2012) because they believe that the term *epistemic* suggests beliefs about knowledge while *epistemological* refers to beliefs about epistemology. Hence, for Hofer and Bendixen, “epistemological best modifies development, given that this describes the development of an individual’s beliefs about knowledge and knowing not the development of their knowledge” (p. 233). Moshman (2013) agrees, suggesting that epistemic cognition is “knowledge about epistemic matters—that is knowledge about the truth and justification of beliefs” (p. 15). Given the divergence in views, in this chapter we have chosen to use the term “personal epistemology” to explore knowledge about truth and justification. This is an umbrella term which we believe can encompass either *epistemic* or *epistemological* beliefs and is also commonly used in the field.

While a range of definitions and terms pervade the field, there is also diversity in research traditions used to examine personal epistemology. These traditions include epistemological development, epistemological resources, multidimensional beliefs, and epistemological theories.

Epistemological Development

Personal epistemology research that draws on the tradition of *epistemological development* examines how such beliefs evolve, especially in academic contexts (Hofer, 2004b). This tradition has a rich history that spans the last four decades and includes work by Perry, Belenky et al., King and Kitchener, and Baxter Magolda (see Brownlee, Schraw, & Berthelsen, 2011, for a review). An example of this developmental approach is evident in the Epistemological Thinking Model by Kuhn and her colleagues (e.g., Kuhn & Weinstock, 2002).

The Epistemological Thinking Model describes how individuals move from a reliance on external authorities through to a view that knowledge is constructed and justified based on evaluated evidence. Kuhn and Weinstock (2002) described positions

which range from absolutist through to evaluativist beliefs (Pintrich, 2002). First, absolutist beliefs reflect an individual's beliefs in knowledge as simply right or wrong and relatively unchangeable (Kuhn & Weinstock, 2002) with little reflection on or evaluation of knowledge claims. This suggests an objectivist stance. Once an understanding that knowledge is tentative emerges, however, individuals may start to view knowledge and knowing as a personal construction. These are referred to as multiplist beliefs because beliefs are based on personal opinions (Kuhn & Weinstock, 2002). There is little need for reflection or analysis because knowledge is inherently a personal construction (subjectivist in nature) that does not need to be supported with external perspectives or evidence. The final position, evaluativist beliefs, involves beliefs that knowledge is constructed, tentative, evidence based, and evaluated in context (Kuhn & Weinstock, 2002). This developmental trajectory reflects a movement from an objectivist view (absolutism) through to a subjectivist view (multiplism) and finally the coordination of objectivism and subjectivism to construct evidence-based knowledge (Kuhn & Weinstock, 2002).

Stahl (2011) claimed that early developmental research described personal epistemology as domain general and shifting over time from “naïve towards sophisticated epistemologies” (p. 45). He argued that current research points to personal epistemology as more variable across contexts and domains of knowledge. There is also some debate about the use of the terms *naïve* and *sophisticated*. Hofer (2006), for example, claimed that it may be quite adaptive to use what might be described as naïve beliefs in the transmission of information in certain disciplines, such as first year medicine, suggesting therefore that it might be inappropriate to label such beliefs *naïve*. We argue that an alternate way to describe the variation in personal epistemologies might be to draw on the nomenclature used in relation to Kuhn and Weinstock's positions described above. By describing changes that develop from *objectivism* through to *evaluativism*, it is possible to articulate variation at a general level without judging beliefs as naïve or sophisticated. In this chapter we will use this terminology to broadly refer to changes in personal epistemologies over time.

A focus on social contexts. More recently, some researchers have explicitly foregrounded the role played by social contexts in the development of personal epistemologies. For example, a social constructivist perspective of personal epistemology was articulated by Muis and her colleagues (see Muis, Bendixen, & Haerle, 2006; Muis & Duffy, 2012) in their TIDE (Theory of Integrated Domains in Epistemology) framework. Muis, Bendixen, and Haerle (2006) proposed that personal epistemology is comprised of both general and domain specific beliefs that are socially constructed. The framework suggested that general beliefs are not tied to a specific discipline (e.g., maths) and are lifelong in duration.

Another personal epistemological framework that articulates a strong focus on social contexts for personal epistemology development relates to epistemic climates. “Epistemic climate can be defined as a context encompassing different epistemic factors (e.g., maths problems and news commentary) and processes (e.g., problem solving and school education) that interact and influence a person's epistemology.” (Feucht, 2010, p. 57). This theorized framework is informed by the EMPE model (The Educational Model of Personal Epistemology), which involves the interaction between teachers' and children's personal epistemologies, epistemic instruction

(“epistemic messages embedded in instruction” p. 59) and knowledge representations (“epistemic messages embedded in content knowledge” p. 59) in a classroom (Feucht, 2010).

The theory of self-authorship offers yet another way of understanding the development of personal epistemologies using social dimensions. The development of self-authorship requires critical self-reflection across three dimensions; epistemological (How do I know?), intrapersonal (Who am I?), and interpersonal (How do I want to build relationships with others?) (Baxter Magolda, 2008). Brownlee, Berthelsen, and Boulton-Lewis (2010) argued that in order for teachers to engage in the complex thinking they “must be able to evaluate multiple perspectives (epistemological dimension) in the context of understanding one’s personal beliefs and values (intrapersonal dimension), and building healthy social relationships (interpersonal dimension)” (p. 103). Understanding teachers’ development of self-authorship would allow their personal epistemology to be examined from an integrated perspective where one’s identity and social contexts (relationships with others) are central to beliefs about knowing and knowledge.

Epistemological Resources and Framing

Other personal epistemology traditions acknowledge the strong role of social contexts but reject the notion of developmental change. These researchers embrace the view that personal epistemology constitutes a set of task-specific resources about knowledge and knowing that vary depending upon the learning task. Hammer and Elby’s *epistemological resources framework* identifies a range of cognitive resources which include “knowledge as propagated stuff,” “knowledge as free creations,” “knowledge as fabricated stuff,” “knowledge as inherent,” and “knowledge as direct perception” (Hammer & Elby, 2002, p. 178). In terms of teaching, epistemological resources are not about changing personal epistemologies from one developmental position to another but rather supporting students to find the most appropriate epistemological resource for the learning task (Stahl, 2011).

An extension of the epistemological resources framework involves the theory of *epistemological framing*. Russ and Luna (2013) described teachers’ epistemological framings as a “moment-to-moment understanding of what is going on with respect to knowledge and learning in the classroom, [which] drives much of teacher practice” (p. 284). For example, such framing might include helping students to construct meaning or helping students to reproduce knowledge (Russ & Luna, 2013). Berland and Hammer (2012) suggested that this process of framing is social in nature because “people signal to each other their framing of what is taking place” (p. 71). The framing model acknowledges “that it is teachers’ dynamic, tacit epistemological frames rather than more stable, long-term epistemological beliefs that give rise to teacher practice” (Russ & Luna, 2013, p. 289).

It is clear that the traditions which foreground social contexts (e.g., TIDE model, epistemic climate) and the fine-grained epistemological resources and framing models reject the idea that personal epistemology is comprised of stage-like developmental positions. Schommer’s view of personal epistemology as multidimensional epistemological beliefs, discussed in the next section, also rejects the developmental positions that originally influenced the field.

Multidimensional Epistemological Beliefs

Schommer's *multidimensional epistemological beliefs* are not about developmental positions but rather independent, multidimensional beliefs which influence learning (Schommer-Aikens, 2004). Teachers may therefore describe many beliefs that may not neatly fit into a developmental position and indeed may appear quite disjointed. Five dimensions of epistemological beliefs were detailed by Schommer and later refined by Kardash and Wood (2000). The dimensions included:

- Structure of knowledge (e.g., beliefs about knowledge as discrete or integrated);
- Construction of knowledge (e.g., beliefs regarding learning as a personal process of constructing meaning);
- Attainability of truth (e.g., beliefs regarding knowledge as certain or evolving);
- Speed of knowledge acquisition (e.g., beliefs that learning takes place quickly or not at all);
- Characteristics of student success (e.g., beliefs regarding innate ability).

There is debate about the extent to which beliefs about speed of knowledge acquisition and characteristics of student success can be legitimately claimed to be about personal epistemology. Many would argue that these beliefs are not focused on beliefs about knowledge or knowing and so should not be included (see e.g., Hofer & Pintrich, 1997; Hofer & Bendixen, 2012). It is interesting to note that this multidimensional concept of epistemic beliefs can allow for individual variations across the five dimensions. For example, a teacher may hold beliefs in the certainty of knowledge (attainability of truth), and at the same time believe that structure of knowledge is complex and integrated.

Epistemological Theories

Another tradition involves Hofer's (2004a) *epistemological theories*. From this perspective teachers can hold theories about the nature of knowing and the nature of knowledge. Hofer and Pintrich's (1997) "beliefs about knowing" include justification and source of knowledge while "beliefs about the nature of knowledge" includes beliefs about the certainty and structure of knowledge. Some studies have used epistemological theories to investigate teachers' personal epistemologies. Brownlee, Berthelsen, and Boulton-Lewis (2004) explored what Australian childcare teachers believed about the nature of knowledge and knowing using Hofer's framework. They noticed that teachers who viewed knowledge as tentative (uncertain) and knowing as based on evaluations of multiple perspectives were more inclined to use approaches to learning that were focused upon making meaning.

Mercan (2012) argued that although the epistemological theories tradition has been a commonly used framework in research, the justification component described as beliefs about knowing needs to be further examined. Alexander (2006) also argued that justification of knowledge is critical to understanding epistemology, and while it has strong roots in philosophical epistemology, it has not been a focus of personal epistemology to date.

A Focus on Justification of Knowledge

The focus on the justification of knowledge or “judgments about assertions” has recently become an important field of research (Briell et al., 2011, p. 19). The argument is that essentially personal epistemology is about how knowledge is justified (see also Hennessey et al., 2013; Greene, Torney-Purta, & Azevedo, 2010; Mason, Ariasi, & Boldrin, 2011; Mitchell, 2013; Murphy et al., 2012). According to Briell et al. (2011) justification of knowledge or judgments about assertions involves evaluating others’ claims, evaluating why different claims compete, and determining the certainty of personal opinions as well as deciding on what is needed to justify a claim. Individuals can justify claims based on authority, personal opinions, or logic (Green et al., 2010).

From this perspective, Hofer’s original beliefs about knowing (justification and source) would be described as epistemology, while beliefs about knowledge (simple and certain knowledge) would be described as ontology. Greene, Azevedo, and Torney-Purta (2008) argued that drawing on philosophy to highlight justification as central to epistemology might help the field gain more clarity. However, Greene, Muis, and Pieschl (2010) still acknowledged the importance of ontological dimensions (simple and certain knowledge) as a basis for justifying knowledge.

Greene and his colleagues (2008, 2010) have used an Epistemic and Ontological Cognition model (EOC) to investigate personal epistemology. Using this framework, they argue for combining developmental (positions) and multidimensional beliefs (dimensions). Their findings suggest that analyses that focus on relations between positions and dimensions, rather than the individual dimensions alone, result in better research outcomes. Hofer and Bendixen (2012) argued that newer models that articulate epistemic and ontological dimensions are in need of further research.

TEACHERS’ PERSONAL EPISTEMOLOGIES

Teacher Learning and Personal Epistemology

Research spanning the last decade has demonstrated that personal epistemologies influence (predict) learning, are products of approaches to learning, and are “seen as a prerequisite to successfully complete higher education” (Stahl, 2011, p. 37). Brownlee et al. (2004) showed that early childhood teachers who held evaluativistic personal epistemologies were more likely to describe meaningful approaches to learning whereby connections between new and prior knowledge and experiences were made. Bråten and Strømsø (2006b) also showed that Norwegian preservice teachers in their first year of study demonstrated beliefs about the speed of knowledge acquisition that influenced their capacity to engage in critical thinking when evaluating web-based resources. Students who viewed knowledge as certain (attainability of truth) were found to be less likely to participate in online discussions, while the students who believed that learning takes place quickly (speed of knowledge acquisition) demonstrated more difficulties managing and evaluating large quantities of web-based resources.

Making connections between ideas and being open to reflecting on many perspectives was evident in a study of preservice teachers by Bondy et al. (2007). They

showed that when preservice teachers believed knowledge was uncertain and integrated they were more likely to engage in meaningful approaches to learning. These teachers made links to prior knowledge, connected ideas, and evaluated information. Thus, personal epistemologies may be one way in which to understand approaches to learning in undergraduate teacher education courses.

As well as understanding the relationship between personal epistemologies and approaches to learning, other research shows that personal epistemologies are related to goal setting and that this in turn influences learning strategies. Using a sample of Norwegian teacher education and business students, Bråten and Strømsø (2006c) identified that personal epistemologies that related to beliefs in quick learning and knowledge as absolute were less likely to engage in mastery goal setting (intention to understand and meaningful approaches to learning). Similar results occurred in a study by Ravindran, Greene, and DeBacker (2005). They found that personal epistemology and goal setting predicted learning strategies in a sample of 101 preservice teachers. Like Bråten and Strømsø, they also found a relationship between evaluativist personal epistemologies, mastery goals, and meaningful learning strategies.

There is also evidence to suggest that personal epistemologies are related to better comprehension in preservice teachers. Bråten and Strømsø investigated comprehension as it relates to personal epistemology over a series of studies (Bråten & Strømsø, 2006a; Bråten, Strømsø & Samuelstuen, 2008). In 2006 they showed how Norwegian preservice teachers with more evaluativist personal epistemologies were better able to understand multiple, conflicting texts. Preservice teachers who held more objectivist epistemic beliefs coped better with texts that did not conflict.

Some research suggests that there is not always consistency between personal epistemology and learning. Peng and Fitzgerald (2006) examined how personal epistemologies were related to learning for U.S. preservice teachers as they participated in case-based hypermedia activities. Case-based hypermedia learning experiences are able to link many forms of media in a single document (e.g., audio and video; Tolhurst, 1995, in Peng & Fitzgerald, 2006) and as such provide a way to promote interactivity and interconnections between many sources of information. The researchers noticed that preservice teachers who believed in quick learning seemed to do better on one particular task that involved an instructional plan activity. While these students, as might be predicted from the theory, did not focus on integrating ideas, it seems that they showed increased ability to use relevant information in the instructional plan activity.

In other research, similar inconsistencies were found between personal epistemology and learning for teachers. Bråten et al. (2008) investigated how Norwegian preservice teachers' personal epistemologies were related to their understanding of science texts about climate change. As might be expected, students who believed that the structure of knowledge was complex demonstrated good comprehension of multiple readings. However, in contrast to these consistent findings, beliefs about knowledge construction did not predict students' understanding. Those who believed that knowledge was received from an authority did better on this task. These data show how different beliefs about knowledge may have various outcomes in terms of comprehension of multiple texts.

Teachers' Personal Epistemologies in Classrooms

There seems to be stronger evidence for the relationship between personal epistemologies and learning than there is for personal epistemologies and teaching (Kang, 2008), although this is an emerging field. It is critical to understand teachers' personal epistemologies because it is likely that the way in which teachers view knowledge and knowing will influence their teaching approaches (instruction and assessment strategies) and in turn their students' personal epistemologies (Schommer-Aikens, 2004). For example, if students are required to engage in assessment which demands genuine inquiry and problem solving, students may develop an understanding that knowledge is both constructed and evidence based rather than simply reproduced.

In the context of early childhood teaching, Tsai and Liang (2009) found a relationship between personal epistemologies and teaching practice for 36 Taiwanese preservice teachers studying science education. The students were engaged in creating a science activity for children and then provided each other with feedback online about the quality of the activity that they developed. Students who were described as holding evaluativist personal epistemologies were judged to have developed more creative and effective learning activities and were also better able to reflect on and use feedback. Brownlee, Edwards, Berthelsen, and Boulton-Lewis (2011) interviewed child care teachers and noticed that those with more evaluativist beliefs tended to teach in a way that relied on child-centered, constructivist interactions.

A range of other studies also support the connection between personal epistemologies and teaching practice. Tsai (2006) demonstrated that a relationship existed between scientific epistemological views (SEVs) and teaching practices with a sample of four Taiwanese teachers. He found that teachers who held "positivist-aligned" SEVs (p. 238) were more transmissive in their approaches to teaching while those with "constructivist-oriented" SEVs (p. 238) engaged in teaching that used inquiry approaches to learning. Sosu and Gray (2012) found that only evaluativist beliefs about the source of knowledge were able to predict teaching practice for preservice teachers (not preferences for teaching). "Student teachers who reported stronger beliefs in reason and empirical evidence rather than experts as source of knowledge demonstrated significantly higher levels of teaching competence" (p. 89). Yang, Chang, and Hsu (2008) and Muis (2004) also noticed consistency between evaluativist personal epistemologies and constructivist teaching practices.

Personal epistemologies may also be related to the notion of evidence-based teaching practices. Evidence-based teaching is a process of bringing together a range of perspectives including those of parents, colleagues, and researchers (Buyse & Wesley, 2006). We would argue that this "bringing together" involves a process of critical reflection and evaluation of this range of perspectives. It is clear that such evidence-based practices would be supported by individuals with an evaluativist or scientific orientation towards knowledge. Katz (1993), drawing on earlier work by Friedson, referred to knowledge orientations as scientific or practitioner related, which closely resemble personal epistemologies. The scientific orientation to knowledge involves what might be described as evaluativism. It relies on coordinating theoretical perspectives with practical experiences to arrive at an informed perspective. The practitioner orientation involves a focus on practical experiences, which reflects a subjective or multiplist personal epistemology. Individuals with a subjective

knowledge orientation may take on board a theory if it matches their own personal view. Mischo, Wahl, Strohmer, and Hendler (2012) examined 712 preservice early childhood teachers' views about knowledge and research in science and found evidence of both subjective and scientific profiles in their sample.

Teachers' personal epistemologies have also been shown to be related to how they support children to become autonomous in their learning (Weinstock & Roth, 2011). Using surveys, Weinstock and Roth asked 600 Year 7 and 8 children how they perceived their teachers promoted autonomy through perspective-taking and the rationale teachers used for engaging in prosocial behaviors. They also examined teachers' personal epistemologies. The study showed that "taking the student's perspective was predicted by teachers' personal epistemologies as a class level predictor" (p. 172).

There is also a body of research which shows that personal epistemologies do not always align neatly with teaching practices (Kang, 2008; Schraw, Olafson, & VanderVeldt, 2011). Some research suggests that more experienced teachers are less likely to practice in a way that reflects their personal epistemologies. Schraw, Olafson, and VanderVeldt (2011) found that teachers in their study showed inconsistent beliefs and practices, suggesting that experienced teachers are less likely to change beliefs when engaged in programs with a short duration. Many, Howard, and Hoge (2002) suggested that it is possible that the broader school contexts may cause a teacher to approach teaching in a way that does not necessarily support their personal epistemologies.

In contrast to these contradictory and unexpected findings, Fives and Buehl (2012, p. 481) argued against the discounting of teachers' belief research due to the apparent lack of alignment of teachers' beliefs and practices and the limited connections of teachers' beliefs to student learning outcomes: "We view beliefs as precursors to action and consider changes in teachers' beliefs necessary for effective change in teaching practices. Moreover, we argue that is not a matter of whether beliefs and practice are or are not congruent but rather the degree of congruence or incongruence between beliefs and practice" (p. 481).

Fives and Buehl suggested that this degree of inconsistency may emerge because of the various functions of beliefs and might be due to a range of internal (e.g., teachers' personal values) and external (e.g., whole of school philosophy) influences on teachers' beliefs.

Influencing Children's Personal Epistemologies

Teachers' personal epistemologies and their teaching practices are likely to influence children's personal epistemologies. The teachers' role in developing children's personal epistemologies has been stressed by Haerle and Bendixen (2008) as vital in shaping children's future as productive citizens in Western societies. The educational implications of developing children's personal epistemology has been linked to children's improved argumentation skills, academic achievement, and problem solving (Cano, 2005; Schommer-Aikins, Duell, & Hutter, 2005; Walker, Wartenberg, & Winner, 2013).

Teachers' choice of instruction has been proposed to influence children's epistemic beliefs (Hofer, 2001). Transmissive methods of instruction and assessment based on

recalling facts are likely to suppress epistemological development as children are not required to engage in complex or critical thinking (Feucht, 2010). Haerle and Bendixen (2008) suggested that in order to succeed in fostering evaluativistic thinking in children, teachers need to be “evaluativistic thinkers themselves” (p. 170) because teachers’ own personal epistemologies and pedagogical practices help children come to understand what counts as knowledge, and what it means to know (Hennessey et al., 2013). Wildenger, Hofer, and Burr (2010) suggested that teachers could facilitate young children’s epistemological development by prompting them to justify their thinking. The use of questioning during storytelling can encourage children to think about the perspectives and intentions of others. This approach can challenge children to think about contrasting viewpoints and help them to express increasingly complex ideas (Wildenger et al., 2010).

Philosophy for Children is an approach to teaching that may help to promote evaluativistic personal epistemologies in children (see Murriss, 2008). A longitudinal study by Walker et al. (2013) examined the effects of a philosophy class designed to engage 7- to 8-year-old children in dialogic interactions as they used evidence to construct arguments. The results indicated that participation improved children’s ability to not only provide evidence and construct their own arguments, but also to generate opposing arguments across domains. Participation in dialogic interactions yielded similar results in a study of 11- to 12-year-old students by Kuhn and Crowell (2011). The study also found that students who engaged in dialogic interactions improved in their ability to build evidence-based arguments.

Teachers play an important role in fostering young children’s personal epistemologies (Haerle & Bendixen, 2008; Winsor & Bendixen, 2009). The more teachers understand about children’s developing personal epistemologies, the better prepared they will be to use pedagogies that will enhance this development. Kuhn and Weinstock (2002) argued that understanding the importance of children’s personal epistemology may encourage teachers to use more real-world instruction and assessment techniques, fostering children’s development of problem-solving, critical thinking, and logical reasoning.

Changes in Teachers’ Personal Epistemologies

Given the theoretical link between personal epistemologies and teaching practices, more needs to be known about how teachers’ personal epistemologies change as they progress through their undergraduate courses and into teaching. Using cross sectional research that examined personal epistemologies of teachers at various stages of their careers, Bendixen and Corkhill (2011) found that experienced teachers held more evaluativist views on the certainty and simplicity of knowledge than beginning teachers. Experienced teachers also held stronger beliefs about innate intelligence compared to beginning teachers. While these findings are important, very few studies have used a longitudinal design to investigate changes; some exceptions to this rule are described here.

In an early longitudinal study, Brownlee (2003) investigated epistemic belief changes in preservice teachers studying in a Graduate Diploma Course in Teacher Education. With an initial sample of 29 preservice primary teachers, interviews were carried out at the beginning and end of their one year course (Time 1 and Time 2).

All participants were then invited to participate in a third interview three years after the completion of their teacher education course (Time 3). Eleven of the original participants agreed to be interviewed at Time 3. The interview analysis revealed that seven teachers described more evaluativist beliefs over time, while the other participants either maintained ($n = 2$) or regressed ($n = 2$) in their beliefs.

In a longitudinal study conducted by Walker and her colleagues, results indicated that personal epistemologies of preservice teachers were likely to become more evaluativist from Year 1 to Year 3 of their undergraduate teacher education degree (Walker, Brownlee, Exley, Woods, & Whiteford, 2011), and then again as they moved into the fourth and final year of a Bachelor of Education degree (Walker, Brownlee, Whiteford, Exley, & Woods, 2012). From Year 1 to Year 3, results showed that preservice teachers were more likely at Time 3 to believe that learning is a process that takes time and that knowledge is interconnected and uncertain (Walker et al., 2011). When the data from the fourth and final year of the course were included in the analysis, the results continued to show development of these beliefs. Preservice teachers were more likely over time to believe that knowledge was interconnected, learning takes time, students' success is not just about innate ability, and knowledge is not absolute and unchanging (Walker et al., 2012).

Similar findings were reported by Rodríguez and Cano (2007) who investigated the personal epistemologies of 81 preservice teachers as they progressed through a three-year teacher education course. The preservice teachers completed the Epistemological Questionnaire (EQ; Rodríguez & Cano, 2007) at the beginning and end of their course. Their results showed that preservice teachers were more likely to view knowledge as evolving, context specific, and integrated as they proceeded through their teacher education course. Rodríguez and Cano (2007) concluded that while the teacher education course appeared to have had some effect on personal epistemologies, the patterns of change that occurred varied across students. Sosu and Gray (2012) also noted shifts in Scottish preservice teachers' personal epistemologies as they progressed through a four-year teacher education program with students developing more evaluativist beliefs regarding ability, sources of knowledge, certainty of knowledge, and learning processes.

While this longitudinal research shows that preservice teachers can experience development of personal epistemologies as they progress through their teacher education courses, it is still unclear what promotes such changes. The next section of this chapter provides strategies that might be useful in teacher education for promoting evaluativistic personal epistemologies.

IMPLICATIONS FOR TEACHER EDUCATION

Research related to preservice and practicing teachers' personal epistemologies can allow for better understanding of the teaching and learning process, and act to inform teacher education courses (Brownlee, Schraw, & Berthelsen, 2011; Kang, 2008). Understanding how preservice teachers' personal epistemologies influence their differing approaches to teaching and learning can inform quality teacher education. Given the growing evidence that teachers' personal epistemologies both shape their own teaching practices and have the potential to facilitate children's developing understanding about the nature of knowledge, it is clear that developing preservice

teachers' personal epistemologies should be an important focus in teacher education courses.

Critical Reflection on Personal Epistemology

As discussed by Hofer (2006), teacher education courses can assist preservice teachers to critically reflect on the way they justify what they know, and how they source and evaluate new knowledge, in order to promote shifts in personal epistemologies. For example, Lahtinen and Pehkonen (2012) found that students in a Finnish study experienced changes in their personal epistemologies during an undergraduate research methods course. The researchers argued that a range of experiences in the course contributed to these changes namely collaborative group work, taking responsibility for managing workshops, and being required to reflect upon a range of paradigms in research.

Several studies have suggested that reflection on personal epistemologies may encourage a shift in preservice teachers' personal epistemologies (Brownlee, Petriwskyj, Thorpe, Stacey, & Gibson, 2011; Valanides & Angeli, 2005). Preservice teachers in the semester long study by Brownlee, Petriwskyi, and colleagues (2011) engaged in implicit and explicit reflection on personal epistemologies. Implicit reflection occurred through a four unit integrated teaching program that modeled collaborative reflexive practice. The preservice teachers engaged in explicit reflection through an assessment task and reflective journals that required them to think about how personal epistemologies influenced teaching practices observed in practicum. The quantitative and qualitative results indicated that over the semester preservice teachers' personal epistemologies became more evaluativist regarding their beliefs about the integration of knowledge (Brownlee, Petriwskyi et al., 2011). Research by Valanides and Angeli (2005) also revealed a link between explicit reflection and preservice teachers' personal epistemologies. Preservice teachers who engaged in explicit reflection on the process of critical thinking as part of an intervention group, showed a statistically significant change in their personal epistemologies.

Augmented Activation and Refutational Texts

The use of refutational texts which provide conflicting information that is supported by evidence and requires elements of argumentation, has also recently shown promise for supporting change in preservice teachers' personal epistemologies (Brownlee, Schraw, & Berthelsen, 2011; Tippett, 2010). For example, Gill, Ashton, and Algina (2004) randomly divided 161 preservice teachers into an experimental group that used a refutational text and augmented activation that challenged and activated their personal epistemologies about mathematics, and a control group that used a traditional expository text. The technique of augmented activation draws students' attention to important information that conflicts with their current beliefs. The use of augmented activation and refutational text was found to promote greater change in beliefs compared to the group exposed to a traditional text. Kienhues, Bromme, and Stahl (2008) further explored the use of refutational texts to promote a shift in epistemological beliefs. Kienhues et al. randomly assigned 58 German undergraduate students enrolled in psychology

and education courses to either an intervention focused on refutational texts or a control group that used non-challenging informational texts. The results indicated that students in the intervention group became more evaluativist regarding their beliefs about the complexity and stability of knowledge, when exposed to the refutational text.

CONCLUSION

In conclusion, while there is evidence that preservice teachers demonstrate more evaluativistic beliefs about the nature of knowledge as they progress through their education degree, there is less understanding about what it is that facilitates this progression. It is likely that the nature of academic learning, in particular critical analysis, may go some way towards driving changes over time. However, as noted by Rodríguez and Cano (2007), not all preservice teachers demonstrate change and the patterns of change are not uniform across the student body. It could be speculated that students who engage more deeply with the learning process across the course of their degree show more significant change in personal epistemologies. This would be a fruitful area for future research. There is also evidence that interventions using instructional strategies such as implicit and explicit reflection, refutational texts, and augmented activation may influence a change in personal epistemologies in teacher education (Brownlee, Schraw, & Berthelsen, 2011). These kinds of instructional strategies should be essential components of teacher education courses if we are hoping to graduate teachers more likely to engage in teaching practices that will support creative and critical thinking in young learners.

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THE INDIVIDUAL, THE CONTEXT, AND PRACTICE

A Review of the Research on Teachers' Beliefs Related to Mathematics

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Teachers' instructional decisions are greatly influenced by their beliefs. The observed intimate relationship between teachers' math-related beliefs and their approaches to instruction has led to a significant amount of research in this area over the last decade (e.g., Bray, 2011; Cross, 2009; Drageset, 2010; Kuntze, 2012; Lloyd, 2005; Philipp et al., 2007; Skott, 2001, 2009; Swars, Smith, Smith, & Hart, 2009; Sztajn, 2003). In this chapter, we focus on describing the empirical and theoretical work on the nature and structure of teachers' mathematics-related beliefs (including beliefs about mathematics, and mathematics teaching and learning) and how they influence teachers' instructional decisions. We place a specific emphasis on empirical work published over the last decade within the mathematics education field.¹ However, to situate the discussion of the most recent research findings related to teachers' mathematics beliefs, we reference a few seminal articles published prior to the last decade.

We begin with the definition of beliefs that anchors our work and discuss how beliefs are conceptualized from both a cognitive and situated perspective. Drawing on these perspectives, we then synthesize the research related to classroom practices, focusing on common threads within the literature. We conclude with a discussion of methodological, theoretical, and practical implications for future research and the professional development of teachers.

DEFINITION OF BELIEFS

Finding an appropriate definition for belief has been a struggle for theorists (Pajares, 1992; Philipp, 2007; Ponte, 2011). This difficulty results from the wide use of the term across multiple disciplines, and the plethora of terms that are often used

synonymously (e.g., orientations, conceptions, and attitudes). Within mathematics education specifically, researchers have also labeled teachers' ways of thinking related to math teaching and learning in a range of ways, including personal theories (Mewborn & Stinson, 2007), school mathematics images (Skott, 2001), and mental models of mathematics (Ernest, 1989).

To make clear how we conceptualize beliefs, we draw on Cross's (2009) definition of beliefs as "embodied conscious and unconscious ideas and thoughts about oneself, the world and one's position in it developed through membership in various social groups, and considered by the individual to be true" (p. 326). Beliefs encompass both strong ideas and assumptions that are sometimes quite vivid (e.g., beliefs about the existence of a supreme being), and thoughts that are less explicit, often absent from the individual's conscious awareness. They are personal, relatively static, and tend to be highly impervious to change irrespective of the nature of contrasting evidence (Nespor, 1987). To better understand the nature of beliefs, how they come into being and the ways they influence what mathematics teachers do, researchers have approached the study of beliefs from a cognitive perspective and also as being situated in activity, context, and cultures—as socially constructed and enacted.

Beliefs as an Individualized Construct

In the early 1980s as constructivist principles took a stronghold in mathematics education, there was a push towards mathematics teaching as problem solving. To enact this vision of mathematics education, teachers' practices needed to be more student-centered. Beliefs were thought to be the gateway to widespread implementation of more student-centered instruction. Throughout this period, a cognitive, individualized conception of beliefs dominated mathematics education research.

From this perspective, beliefs (broadly defined) are considered to be mental representations, integral components of an individual's conscious thought. These ideas about the world are developed over a lifetime of experiences through our interactions with the world and others (Op 't Eynde, DeCorte, & Verschaffel, 2002). They provide a framework from which we view and interpret the world. As such, many mathematics education researchers consider mathematics-related beliefs to be a significant, perhaps the most critical, factor in determining what teachers do in their classrooms. Similar to the "social turn" (Lerman, 2001, p. 3) in mathematics education that occurred in the late 1980s, examining the cognitive influences on teachers' decision-making and instruction was in an attempt to shift from a behaviorist perspective to view teaching as more than a behavioral response to constraints and rewards.

Seminal studies in the field aligned with this perspective (e.g., Cooney, 1985; Thompson, 1992) provided insight into the mental lives of teachers but fell short of expectations in that mathematics-related beliefs research did not provide clear solutions to "problems of implementation" (Skott, 2009, p. 28). Results from the plethora of research (see Philipp, 2007; and Thompson, 1992, for reviews of these studies) over the span of 20 plus years did not provide a roadmap for the ways teacher education and professional development programs could transform teachers' beliefs that would guarantee instruction aligned with constructivist principles.

Some researchers (e.g., Skott, 2001; Lerman, 2001) have argued that this individualized perspective on the study of beliefs has narrowed the lens through which we could come to a deeper understanding of the belief-practice relationship. However, others contended that keen insights into the belief-practice relationship could be gained by attending to the nature and organization of teachers' mathematics beliefs. In particular, the personal, resolute nature of beliefs is often attributed to a particular feature of beliefs—their organization as belief systems (Green, 1971). We will not include a full discussion of the philosophical perspectives on belief structure; instead, we refer you to Skott (Chapter 2, this volume). However, we consider Green's (1971) perspective on the organization of belief systems a useful framework for understanding inconsistent findings in research on the beliefs-practice relationship. We draw on this framework later in our discussion.

Beliefs as a Social Construct

Socio-cultural perspectives see individuals as constitutive of social and cultural practices and not simply influenced or affected by them (Rogoff, 1990). Although individuals have physically developed independent bodies and brains, what constitutes the "person" are dispositions acquired through their interactions within different social contexts and are not merely natural endowments (Martin, 2006; Op 't Eynde et al., 2002).

In contrast to the highly individualized perspective reflected in beliefs research since the 1980s, more recently several researchers (e.g., Lerman 2001; Skott, 2001, 2009; Wedege & Skott, 2006) have examined the belief-practice relationship through a more social lens. They argued that beliefs are qualitatively different depending on the context in which they are enacted (Lerman, 2001), so to examine beliefs without paying close attention to the unfolding of teachers' practices through interaction within contexts would be methodologically and analytically inappropriate (Skott, 2009). Reflective of these perspectives, Hoyle (1992) distinguished between "decontextualized beliefs and beliefs-in-practice" (p. 40) and posited that all beliefs are situated. Decontextualized refers to the notion that beliefs are held in isolation of context. In contrast, she proposed that all beliefs (beliefs-in-practice) are situated and are "dialectical constructions, products of activity, context and culture" (Hoyle, 1992, p. 42). Hoyle (1992) challenged the idea that the content of beliefs can be separate from the context within which the beliefs emerge; rather she contended that situations co-construct beliefs through activity. From this perspective, simultaneously held contradictory beliefs can be explained through an awareness or knowledge of the particular affordances and constraints within the context or situation.

Skott (2009) in his study also moved beyond this predominantly individualized perspective by viewing context differently in attempting to understand the role of context in belief enactment. He encouraged beliefs researchers to contextualize the act of teaching within "intersubjectively and continually re-generated settings" (p. 44). In his study of one first year teacher, Larry, who had competing educational priorities, he identified that Larry's fluid approach to teaching different classes and the seeming misalignment between his beliefs and practices could be explained by adopting a more social stance. Acknowledging that practices do not occur within

static and isolated contexts, Skott observed that for Larry, there existed multiple, possibly conflicting virtual and existing communities of practice that he needed to continuously navigate. In this regard, similar to others (e.g., Ambrose, 2004; Goos, 2005; Llinares, 2002), he contended that examining belief enactment from a social stance provides new conceptual and analytical constructs with which to study the role of teachers' beliefs. Although a significant portion of mathematics beliefs research aligns with the cognitive perspective, more researchers are attending to the role context plays in shaping teachers' instructional decision-making and actions.

TEACHERS' MATHEMATICAL BELIEFS/ HIERARCHICAL STRUCTURE

Teachers' mathematics-related beliefs are often classified in two categories: beliefs about the nature of mathematics and beliefs about mathematics teaching and learning (Cooney, 2003; Thompson, 1992). Beliefs about mathematics have been widely discussed as they are thought to have a strong and powerful impact on teachers' beliefs about teaching and appropriate modes of learning (Ernest, 1989). Ernest (1989), building on the work of Kuhs and Ball (1986), identified and distinguished between three different views (i.e., problem-solving, instrumentalist, and the Platonist views) about the nature of mathematics and proposed that they have a potent impact on teaching. As such, a problem-solving view of mathematics can promote a more student-centered, inquiry-based classroom while a Platonist or instrumental view can lead to a more passive learning environment where the teacher is the arbiter of knowledge. Mathematics beliefs similar to the instrumental and the Platonist perspectives, and the teaching strategies derived from them, have been considered problematic for decades as they present narrow views of mathematics that do not support mathematical sense-making (Schoenfeld, 1992).

Cross (2009) provided empirical support for the connection between these two sets of beliefs in her study of middle grades mathematics teachers. The findings of her study showed strong connections between teachers' beliefs about pedagogy and student learning and their beliefs about mathematics as a discipline. Cross (2009) concluded that the teachers' beliefs were organized in a system such that beliefs about teaching and learning (i.e., derivative) were rooted in the teachers' mathematics beliefs (i.e., primary; cf. Green, 1971). Cai and Wang (2010) also observed similar results in their comparative study about U.S. and Chinese teachers. They found that the dominant philosophical belief about the nature of mathematics influenced teachers' beliefs about learning and teaching mathematics.

Despite these results, the relationship between teachers' mathematics beliefs and their instructional practices is not considered linear. The relationship is thought to be complex suggesting that researchers should investigate beyond teachers' professed beliefs (Charalambous, Philippou, & Kyriakides, 2008; Cross, 2009) and beyond topic-specific beliefs (Cross & Hong, 2012; Leatham, 2006). As such, to get an adequate picture of any teacher's beliefs, the researcher should engage in repeated observation of the learning environment and his/her instruction (Cross & Hong, 2012; Leatham, 2006). In the sections that follow we discuss how researchers over

the past decade have explored these sets of mathematics teachers' beliefs across the continuum and in relation to other constructs.

TEACHERS' BELIEFS AND INSTRUCTIONAL PRACTICES ALONG THE TEACHING CONTINUUM

One of the broadly investigated issues about beliefs in the mathematics education literature is their effect on teachers' instructional practices. It is widely accepted that beliefs influence both general approaches to instruction (e.g., preferred curricula, as discussed in Cai & Wang, 2010, and Herbel-Eisenmann, Lubienski, & Id-Deen, 2006) and in-class instructional decision-making (e.g., questioning and discourse strategies, Bray, 2011). The plethora of research on mathematics teachers' beliefs over the last few decades has been propelled by the presumption that the quality of teaching and learning will improve if teachers hold beliefs that are supportive of constructivist-based, student-centered practices. However, this does not seem to be the case. Studies that would serve as confirmation of this notion, the idea that teachers who hold reform-oriented beliefs in mathematics are better able to develop and maintain effective learning environments, are not conclusive (Wilson & Cooney, 2002). What we do know from the mathematics education literature is that mathematics beliefs *do* influence teachers' pedagogical decisions and classroom practices (Beswick, 2012; Biza, Nardi, & Zachariades, 2009; Bray, 2011). However, there are still open questions about the kinds of beliefs that are most influential to pedagogical decision-making and the role context, and other factors, play in instructional events that unfold in the classroom (Herbel-Eisenmann, Lubienski, & Id-Deen, 2006; Skott, 2001; Swan, 2007; Sztajn, 2003).

This influence beliefs have on teachers' instructional practices is linked to how beliefs originate and develop over a lifetime. Richardson (2003) suggested that beliefs developed through three sources: personal experience, experiences in schooling and other forms of instruction, and experience with formal, academic knowledge (cf. Klein, 2004). In this regard, the study of beliefs becomes quite important in the education field, as unlike other professions, novices within the teaching profession enter with experiences from their student careers (Pajares, 1992; Richardson, 1996). These novices can be considered "insiders" as they already have deep and intimate knowledge about school and the education process and tend to view their new experiences through their "old eyes." These beliefs are so pervasive that they tend to pose strong barriers to change. Early studies (e.g., Borko, Mayfield, Marion, Flexer, & Cumbo, 1997) often reported that more traditional mathematics beliefs were often resolute despite the aim of teacher education and professional learning programs to transform them. More recently studies (e.g., Beswick, 2007/2008; Swars, Smith, Smith, & Hart, 2009) have found that teacher learning programs have shown greater promise in generating shifts in teachers' mathematics beliefs. In particular, Beswick (2007/2008) and Swars et al. (2009) found shifts in teachers' (preservice and inservice) beliefs after engagement in evidence-based programs designed to meet the teachers' needs. Swars et al. (2009) also reported that the preservice teachers in their study were initially skeptical of the constructivist-based model of the program based on their prior experiences in elementary and secondary school (which were predominantly traditional) showing that residue of early schooling can deter

the change process. Beswick (2007/2008) made specific mention that the voluntariness of the participants was an important factor in the positive change. Although these studies reported positive outcomes, they also testify to the unwavering nature of beliefs.

The beliefs-practice relationship among teachers has been examined across the continuum of the profession, ranging to preservice teachers (PSTs—teachers who enrolled in a teacher education program; e.g., Philipp et al., 2007), to inservice teachers (experienced teachers; e.g. Herbel-Eisenmann, Libiensi & Id-Deen, 2006). Our review of this research indicated that there is a trend in the kinds of research conducted with teachers at different stages of the profession, distinguishing between those in training and inservice teachers. We discuss these trends below.

Preservice Teachers: Nature of Beliefs and Belief Change

A significant portion of the research in mathematics education (e.g., Ambrose, 2004; Wilkins & Brand, 2004) involving preservice teachers has focused on investigating the nature of their beliefs and ways to transform their existing traditional mathematics-related beliefs to those supportive of mathematics problem solving. Initially, within most programs, teacher educators and researchers approached belief change through two main avenues: education courses promoting constructivist ideology (e.g., Swars et al. 2009) and through the practice of student teaching (e.g., Philipp et al., 2007). However, success through these avenues varied, with some studies revealing that frequently these experiences tend to solidify the teachers' initial beliefs rather than change them (Ambrose, 2004; Beswick, 2012). To improve the rate of success of these efforts it was suggested that courses in the teacher education program be geared towards achieving dissonance through engaging PSTs in educational experiences that contrasted early ones (Swars et al., 2009). The discomfort experienced by this disequilibrium would motivate PSTs to reflect on their conflicting views and experiences. In the cases where experiences in the teacher education courses were useful for positively changing mathematics-related beliefs to more constructivist-oriented beliefs, facilitators of change included (a) opportunities for PSTs to reflect on the content of their own beliefs (Gill, Ashton & Algina, 2004; Kaasila, Hannula, Laine, & Pehkonen, 2008), (b) reflection on their own experiences of learning and teaching mathematics that were positive but different from prior experiences (Artzt, 1999; Kaasila, Hannula, Laine, & Pehkonen, 2008; Nyaumwe, 2004), and (c) positive and powerful mathematical experiences that align with desired beliefs and motivate new ways of thinking (Lavy & Shriki, 2008; Namukasa, Gadanidis, & Cordy, 2009; Nyaumwe, 2004; Swars, Smith, Smith, & Hart, 2009). A key component of successful work in this area has also been extended work with teachers over time (e.g., Cross & Rapacki, 2012; Swars et al., 2009). In Swars et al.'s (2009) year-long study, 24 PSTs were engaged in a constructivist-oriented two-semester mathematics methods course with a coordinated field experience. Findings showed a statistically significant increase toward a constructivist orientation on the MBI (Mathematics Beliefs Inventory). They attributed these shifts to the course structure, which supported PSTs in experimenting with new ideas and reflecting on the outcomes over the extended field experience. There was also a statistically significant increase in efficacy towards teaching mathematics that seemed to result from

accomplishments in implementing constructivist pedagogy due to the prolonged exposure to the approach and vicarious experiences.

Reflection is considered one of the key facilitators of change as “it reveals [teachers’] motivations and dispositions, [in ways that help teachers] reorganize their understandings of the relationships between their thoughts and their instructional practices” (Artzt, 1999, pp. 160–161), which helps them be more thoughtful about their inquiry-based mathematical experiences, and to draw greater meaning from these experiences (Philipp et al., 2007). In more recent years, researchers (e.g., Charalambous, Panaoura, & Philippou, 2009; Philipp et al., 2007) have had notable success with courses or programs designed specifically for PSTs to have experiences that combine student-centered pedagogy, mathematical activity that supports thinking and reasoning, and experiences learning about children’s mathematics. Students engage in mathematical activity (e.g., solving rich problems) as a significant portion of these courses with the goal of helping them see mathematics as a creative process of building ideas and solving meaningful problems. This format allows PSTs to see mathematics as sense-making, thereby contrasting prior traditional experiences. In so doing, PSTs have a personal lens through which to interpret theory and their experiences in the field. Additionally, Philipp et al. (2007) concluded from their study with 159 PSTs that their experiences learning about children’s mathematical thinking and the opportunities to reflect on these experiences were instrumental in the PSTs developing more sophisticated mathematics-related beliefs.

Kaasila et al. (2008) also identified discourse communities as integral to the process of change as they provide the cognitive tools (i.e., ideas, theories, concepts) that preservice teachers use to make sense of their experiences. Charalambous, Panaoura, and Philippou (2009) cautioned that in designing these courses, researchers and teacher educators should monitor their impact on other cognitive constructs. While these courses may have positive impact on changing mathematics beliefs, they may have adverse effects on other beliefs (e.g., self-efficacy) concurrently. In their study, PSTs were enrolled in courses designed around the history of mathematics with the goal of helping them see how the history of mathematics informed school curricula. Although PSTs’ platonic beliefs about mathematics declined, their attitudes were significantly less positive by the end of the courses. They attributed this to PSTs’ difficulty with grasping the content, which triggered memories of negative past experiences with the subject, inducing anxiety and the fear of low grades. More recently, research on this particular group has expanded beyond discipline-specific beliefs to include personal beliefs (e.g., self-efficacy, teacher sense of efficacy), content knowledge and mathematical knowledge for teaching (MKT), relationships among these constructs, and how they influence math-related beliefs (discussed in more detail below). As these explorations have also involved inservice teachers, we discuss this research in the next section.

Inservice Teachers: Beliefs-Practice Relationship and Other Influential Factors

Much of the research on the relationship between beliefs and practice has been done with inservice teachers who are embedded in teaching contexts with students. One key finding from research in this area, described in previous reviews, is that beliefs

and practices often appear to be misaligned (Philipp, 2007; Thompson, 1992). As beliefs are extremely complex, researchers have sought to explain this phenomenon in multiple ways. One approach has been to explore the relationships among math-related beliefs, revealing that there is a stronger connection between teachers' beliefs about mathematics content and instructional practices than there is between teachers' beliefs about teaching and learning and their practices (Cross, 2009; Kuntze, 2012). In this regard, although teachers may espouse reform-oriented beliefs with respect to teaching and learning, if their belief about mathematics are more traditional, their practices will align with the latter, as was the case of Joanna in Raymond's (1997) case study (discussed in more detail below).

In some cases teachers seem unaware that their professed beliefs do not actually align with their practices (Beswick, 2012; Sztajn, 2003), while other teachers appear more cognizant of this seeming misalignment and state that there are the intervening factors (e.g., Herbel-Eisenmann, Lubienski, & Id-Deen, 2006; Swan, 2007) that are more influential to their instructional decisions. This recognition that some beliefs are more central, and therefore more strongly held and influential (cf. Green, 1971), and that other factors play a role in instructional choices, has motivated researchers to examine this phenomenon more closely with the goal of explaining these apparent inconsistencies. With respect to non-belief factors, both teachers and researchers have attributed this inconsistency to limited time to complete the syllabus, curricula, parental expectations (Herbel-Eisenmann, Lubienski, & Id-Deen, 2006), cognitive factors (Speer, 2005), lack of resources (Cross & Hong, 2012), students' misbehavior, and students' lack of motivation.

In Raymond's (1997) earlier work in this area, she described the case of an elementary teacher, Joanna. Joanna held traditional beliefs about mathematics but non-traditional beliefs about mathematics teaching and learning. Raymond concluded that lack of time and resources, students' misbehavior, and concerns about standardized tests were factors that influenced her instructional decisions. Sztajn (2003) in her study of two inservice elementary teachers concluded that societal factors and context played an important role in the teaching behavior of these teachers, although context was framed somewhat differently. Unlike Joanna, these teachers' practices were not motivated by school-based factors; rather, their beliefs about children, society, and education were the main influential factors in the ways they taught. Although the participants in Sztajn's study taught students with vastly different socioeconomic statuses (SES), SES played a significant role in their teaching behavior such that the motivation behind the teacher of the lower SES students was to make "good citizens." The teacher with high SES students held similar beliefs yet taught from a student-centered approach because she perceived her students' needs were different. As such, concerns about how to best prepare these students for the future, given their backgrounds, impacted their teaching.

Herbel-Eisenmann et al. (2006) have also concluded that teachers' decision-making and behavior may reflect strong influences from the political and social contexts in which teachers are embedded, parental and student expectations and choices, and teachers' access to curricular materials and resources. In their case study, Jackie, an 8th grade teacher, identified students' and parents' expectations and the curricular materials as critical factors in her instructional decision-making. Her school district offered parents the option between a reform-oriented curriculum and a

conventional algebra series. Although she thought one approach (and the corresponding curriculum) was better for student learning, she felt compelled to teach each one with fidelity due to her own work ethic and the district guidelines.

Another key factor in the beliefs-practice relationship is culture. Cultural background influences the way beliefs impact instructional practices (Cai, 2004; Cai & Wang, 2010). For example, in their comparison study between U.S. and Chinese mathematics teachers' beliefs, Cai and Wang (2010) found Chinese teachers placed great importance on the role of the textbook in describing their views about high-quality teaching. They attributed this to unified curriculum in China that provided instruction guidance on how to prepare students for national high stakes tests. Additionally, Cai's (2004) study about U.S. and Chinese teachers' scoring of student responses examined how teachers' beliefs affected their evaluation of student work. She used this evaluation as a proxy to understand teachers' beliefs about teaching and learning of mathematics in practice. There was a significant difference between U.S. and Chinese teachers' scoring of many student items suggesting that even though teachers from both countries held similar views about scoring practices, they held different expectations from students in particular situations. Cai (2004) suggested that this difference resulted from their beliefs about teaching and learning mathematics which were based on their own cultural beliefs. She concluded that "in teaching and learning, the Confucian tradition emphasizes teacher's authority and students' hard work, while the Socratic tradition emphasizes the students generating knowledge by questioning themselves and others" (Cai, 2004, p. 284).

The Influence of Cognitive and Contextual Factors on Beliefs and Teachers' Practices

Mathematical Knowledge. In more recent years researchers have also begun to examine the relationship between discipline-specific beliefs and other cognitive constructs such as efficacy and teacher knowledge (e.g., Drageset, 2010). With a significant focus being placed on teachers' content knowledge and mathematical knowledge for teaching (MKT) within the mathematics education community, researchers have begun to investigate the effects of beliefs in conjunction with mathematical knowledge on practice. There is a vast body of literature describing the relationship between teachers' knowledge of mathematics and their instructional approaches (e.g., Hill et al., 2008) from which to draw.

Given that both of these factors are particularly influential on teachers' instruction, research in this area is on the rise. For example, Bray (2011) investigated how teachers' knowledge and beliefs affected their error handling practices in mathematics instruction. He found that teachers' beliefs were the most influential factor in teachers' intended reactions in situations where students made errors, while the quality of teachers' responses to these situations were determined by their knowledge about the relevant content. Another study conducted by Biza, Nardi, and Zachariades (2009) revealed that teachers' evaluation criteria were related to their beliefs about the approach being used in the solution as well as their knowledge about the mathematical context. For instance, if the student used a graphical approach for a proof task, teachers found it persuasive without further investigation of the

sufficiency of the response because they believed using graphs in proof was important and valuable.

Several studies have also linked teachers' level of mathematical understanding and MKT with their mathematics-related beliefs. Swars et al. (2009) found that teachers (pre-service) with greater MKT tended to hold more cognitively/constructivist-oriented beliefs and stronger personal teaching efficacy. Similarly, Perry, Way, Southwell, White, and Pattison (2005) have investigated the relationship between pre-service teachers' beliefs and mathematical knowledge and found that the stronger the belief in the importance of computation and correct answers, which is reflective of more Platonist view of mathematics, the lower the mathematical content knowledge.

Other Beliefs. The move to explore other belief constructs in addition to discipline-specific beliefs came with the realization that teachers' instructional decision-making is mediated by contexts (Raymond, 1997; Sztajn, 2003) and is also influenced by other beliefs. In particular, beliefs about knowledge (epistemological beliefs), beliefs about one's ability to impact student mathematics learning (teacher efficacy), beliefs about one's own mathematical ability (self-efficacy) and beliefs about students (beliefs beyond mathematics—discussed previously) have been shown to influence practice. Although the construct has been studied for several decades (see Woolfolk Hoy [2004] for a discussion on the development of the construct), research on the relationship between teachers' sense of efficacy, a teacher's confidence in her ability to promote student learning, and mathematics teaching has been more recent in the mathematics education literature.

Researchers (e.g., Guskey, 1988; Swars, 2005) suggest that teachers with a stronger sense of efficacy are more open to new ideas, more willing to adopt innovations, less likely to experience emotional burnout, and tend to set high expectations for their students. Motivated by what we know about teachers with high teacher efficacy, mathematics education researchers (Charalambous, Panaoura, & Philippou, 2009; Charalambous, Philippou, & Kyriakides, 2008; Phelps, 2010; Swars, Smith, Smith, & Hart, 2009) have explored this construct with pre-service teachers focusing mainly on examining how courses within teacher education programs have impacted PSTs' beliefs about their skills and abilities to teach mathematics well. This construct has been explored during fieldwork (e.g., Charalambous, Philippou & Kyriakides, 2008), and, in some cases (e.g., Charalambous, Panaoura, & Philippou, 2009), mathematics courses have been designed such that PSTs can experience mathematics as a creative human activity and a discipline built on sense-making and pattern-seeking.

Findings suggest that PSTs' efficacy beliefs are amenable to change during fieldwork (including field experiences and student teaching) and that gains in efficacy were dependent on participant's experiences as learners of mathematics and their interactions with peers and mentors (Charalambous, Philippou, & Kyriakides, 2008). Although the development of efficacy beliefs did not appear to develop in uniform ways, the factors that informed the development of these beliefs align with seminal research in this area (e.g., Bandura, 1997). In particular, enactive experiences (personal experiences of success related to the task), vicarious experiences (observing another experience success accomplishing the task), and social persuasion (positive reinforcement or encouragement from others related to the task) were the key influential factors in advancing efficacy beliefs.

For many teachers, to teach for understanding requires a paradigmatic shift in how they view mathematics, teaching and learning, themselves as learners, and their ability to teach effectively—beliefs are a key component in orchestrating this shift. From research we know that in addition to beliefs, cultural background, depth of mathematical understanding, and the special knowledge needed to teach mathematics, are also important factors in this process. As beliefs researchers continue to explore these factors, the more we will know about how to best help preservice/inservice teachers along the process to becoming successful teachers.

DIRECTIONS FOR FUTURE RESEARCH

At the onset of the beliefs research era in mathematics education, a driving force was the need for insight into ways to align classroom instruction with a problem-solving orientation to mathematics education. Although the vast research in this area didn't provide a guidebook for how to transform teachers' instructional practices, within the field we have gained significant insight into this "messy" construct (Pajares, 1992). However, unanswered questions and unresolved conceptual issues still remain. Two key issues, separate but related, that arise from our previous discussion are the notion of inconsistency between beliefs and practices, if/when is belief change warranted, and when warranted, how should it be approached. In the next section, we address these issues and discuss theoretical, methodological, and practical implications based on our review.

Theoretical Implications: Attending to the Issue of "Inconsistency"

To deeply understand how the belief-action relationship works and to explain perceived contradictions within this relationship, we must consider that belief systems are dynamic in nature (Thompson, 1992), they are organized in clusters (Green, 1971), and individuals tend to organize their beliefs within the system so they cohere (Pehkonen, 2004). Given these criteria, we draw on Leatham's (2006) sensible systems framework to situate our discussion related to inconsistency in the belief-action relationship.

Leatham's Sensible Systems Framework. Leatham's framework is particularly valuable as it operationalizes the research stance proposed by Philipp (2007) in the *Second Handbook of Research on Mathematics Teaching and Learning*. Philipp advocated that in investigating beliefs, we approach research from the perspective that discrepancies between teachers' beliefs and practices do not exist. Instead, if we conclude from our observations that teachers' espoused beliefs are incongruent with their practices, we must seek to resolve this incongruence. Philipp suggests that we assume the belief-practice contradictions exist in our minds and not within the teachers. Holding this notion that there exists inconsistencies or contradictions between what teachers say and do as untenable, Leatham (2006) grounds his framework in the basic assumption that "teachers are inherently sensible rather than inconsistent beings" (p. 92). In essence, the set of beliefs that an individual holds is organized in ways that make sense and are coherent to them (Op 't Eynde, DeCorte, & Verschaffel, 2002). These beliefs are not necessarily justified based on evidentiary support; instead the individual will make adjustments within the system

until coherence is obtained. Thus, “whenever beliefs that might be seen as contradictory come together, the person holding the beliefs finds a way to resolve the conflict within the system” (Leatham, 2006, pg. 95). In this regard, from the individual’s perspective the system is sensible. How beliefs are organized and clustered may not be identifiable by the individual; nonetheless, this does not make them less coherent to the individual.

Holding these assumptions, Leatham (2006) makes the following recommendations for investigations into beliefs: (a) it is essential that the researcher “. . . take into account the conceptual framework for beliefs when interpreting the findings of research on beliefs” (p. 97), (b) the idea that a teacher can clearly articulate her beliefs and at the same time act in ways contrary to these beliefs does not align with the notion that teachers are sensible, yet complex individuals, and (c) it is more productive for research to focus on providing coherent models of teachers’ belief systems, thereby attending to the beliefs with which teachers’ actions actually cohere, rather than the beliefs with which researchers think they should cohere.

Using these recommendations as a lens for reinterpretation, we suggest an alternative perspective for interpreting such results. In studies (e.g., Cooney, 1985; Raymond, 1997; Skott; 2001) where researchers have observed such inconsistencies between teachers’ beliefs and their practices, the focus is usually on investigating a particular set of beliefs; for example, within mathematics education, beliefs researchers tended to focus on math-related beliefs. With such a narrow focus, it is likely that observed teacher actions are connected with the beliefs under investigation, which may not necessarily be the beliefs with which the observed action most closely coheres. In this regard, when apparent discrepancies are observed in the belief-action relationship, it is possible that either the belief-action relationship inferred by the researcher was incorrect, the observer failed to notice another belief that was foregrounded in that situation, or there were intervening contextual factors that influence the observed action (Cross & Hong, 2012). As such, observations that indicate possible inconsistencies should not lead to immediate conclusions; rather, they should be interpreted as opportunities for further investigation and exploration.

Methodological Implications

Measuring beliefs requires the researcher to make inferences from what people say and do (Pajares, 1992). Within mathematics education, case study methodology and the use of Likert-scales surveys are the most common approaches to assessing beliefs. The use of Likert-scale surveys present serious concerns (Henson, 2002). First, they require teachers to self-report their practices and beliefs, which raises concerns about reliability and validity.² Additionally, data on beliefs and practices tend to be collected separately,³ as Hoyle (1992) described, in a “decontextualized” form. Taking into account that context plays a role in how beliefs are enacted, Speer (2005) recommended “. . . data on beliefs should come from sources that are tied to the particular practices that one seeks to understand . . . one should begin with practices and gather data related to beliefs in connection with those practices and contexts” (p. 373). In this regard, stimulated video recall and video discussions (where teachers discuss their beliefs and decision-making process while viewing themselves teaching) (Sherin & van Es, 2009) are recommended tools to

investigate questions related to beliefs and practices. Henson (2002) also suggested that to capture the information lost on a questionnaire we should observe teachers in context, via observation or to follow up with “think alouds” where teachers elaborate on why they responded the way they did (p. 147).

Second, they tend to force teachers to try to condense their complex sets of beliefs into short researcher-determined statements or categories which may differ to varying degrees to researchers’ statements (Fang, 1996). In many cases these statements are not mutually exclusive so they create dichotomies that may not exist in the teachers’ beliefs systems. Third, these scales are constructed to assess mathematics beliefs while teachers’ actions are often motivated by factors beyond beliefs about mathematics, as we have discussed in this chapter. Although Likert scales allow us to collect large data sets, they are limited in their ability to capture the rich detail of teachers’ own descriptions of their beliefs, how they interpret their own actions, and the complexity and multifaceted nature of teachers’ beliefs systems (e.g., Charalambous & Philippou, 2010).

Qualitative approaches, incorporating a range of instruments (e.g. interviews, classroom observations, etc.), are also common in mathematics education research. They are widely used because they provide detailed, rich descriptions about the phenomenon under investigation, e.g. teachers’ beliefs. However, irrespective of the in-depth data yielded, issues of validity with respect to time and instrumentation are still of concern. Given the complexity of the construct and the participants, careful consideration needs to be given to what, how, and when the data is collected. For many of the studies discussed in this chapter, the data collection period ranged from a single administration of instruments to a few months, where data was collected intermittently over the time period, with a specific focus on mathematics beliefs. Taking as an assumption that teachers are complex individuals with complicated mental lives, it follows then that how an individual acts cannot be determined by examining one aspect of their psychological worlds. Second, as Shavelson, Webb, and Burstein (1986) stated, “[T]eachers’ classroom decisions usually are not ‘once and for all.’ Rather, they are made incrementally and adjusted on the basis of subsequent information (feedback)” (p. 79). Therefore, in order to gather the most meaningful data to support our work with teachers, we must conduct more extended, focused investigations of teachers’ mental lives and actions across context.

Practical Implications: Belief Change or Foregrounding Core Beliefs?

Over the last decade, beliefs researchers in mathematics education have expanded the scope of study to include investigations into self-beliefs (e.g., self-efficacy, teacher sense of efficacy) teacher factors (e.g. teacher knowledge) and contextual factors (e.g. standardized testing), the relationships among these constructs and the ways they influence instruction. Results from these investigations have shown that math-related beliefs are not always the key factors or core beliefs influencing instruction. As Green (1971) described in the second dimension of the belief system, some beliefs (core beliefs) are held with greater strength than others and can be the dominating belief that motivates an action. Another consideration is that certain elements with the school context are so pervasive that they become foregrounded in teachers’ instructional decision-making. Attending to these factors are key in any discussion of belief change.

Researchers must make thoughtful decisions about the methods employed in data collection. In this regard, longitudinal studies are quite attractive as they allow for extensive data collection in duration and breadth. In so doing, researchers can better identify the key factors that drive teachers' actions and provide usable knowledge for teacher educators and professional developers to support their work with teachers. With the insights garnered from these extended explorations, researchers can more accurately determine whether belief change is warranted or if the situation requires a 'power-shift' within the belief clusters so that desired math-related beliefs are foregrounded in instructional decision-making. With this focus, teacher educators and professional developers will be better equipped to help teachers (pre-service and in-service) develop strategies to address school-related issues that negatively influence instruction, or reorganize their beliefs so the desired math-related beliefs become core beliefs (more central in decision-making). Although studies of this nature do not gain traction in the heavily political arena of education (Philipp, 2007), they do provide the best promise for seeing more long-term, sustained implementation of reform based practices.

NOTES

- 1 Given the fairly recent publication of a review chapter on beliefs (see Philipp, 2007) in the *Second Handbook of Research on Mathematics Teaching and Learning*, we focus on the empirical work published in the leading journals in mathematics education since 2000. They include *Journal for Research in Mathematics Education*, *Journal of Mathematics Teacher Education*, *Educational Studies in Mathematics*, *Journal of Mathematical Behavior*, *Mathematics Teacher Education and Development*, *For the Learning of Mathematics*.
- 2 Human beings tend to reconstruct their memories so even when trying to be truthful, their recollections may be skewed. Also, it is possible that participants may report what they think the researcher wants them to say or think, or they may state what is socially-desirable behavior within the community (Richardson, 2003).
- 3 We want to emphasize here that decontextualized data is often collected when applying both quantitative and qualitative methods.

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20

BELIEFS ABOUT READING, TEXT, AND LEARNING FROM TEXT

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Our chapter explores preservice and K-12 teachers' beliefs about what reading is (i.e., its nature), what it means to develop as a reader, and what pedagogical practices may best aid such development. We also examine teachers' beliefs about the nature of text (i.e., what a text is and what it "does") and what it means to learn from text. In reviewing extant literature, we also indirectly explore the beliefs of researchers and teacher educators about reading, text, and learning from text. We think such beliefs are implicit in the frames used by researchers to study teachers' beliefs and are reflected in interventions aiming at shifting teachers' views. In making explicit the lens through which teachers' beliefs about reading have been studied, we hope to facilitate critical appraisal of current understandings of teachers' beliefs about reading and to foster identification of productive avenues for future research.

CHARACTERISTICS OF OUR EXPLORATION

Underpinnings

The specific articulation of teachers' beliefs about reading explored in this chapter and the inclusion of beliefs about text and learning from text is based on a view of reading as interactive, multidimensional, and developmental (Fox & Alexander, 2011). This theoretical standpoint directed and delimited our exploration and also provided the critical lens through which we viewed extant literature. Thus, it seems important to briefly describe our own view of reading before sharing the results of our exploration of teachers' beliefs.

We view reading as interactional in nature, because reading enables a relationship between a reader and a writer, via a text (Mey, 2003). In this respect, reading is closely intertwined with conceptualizations of text and of learning. Learning about oneself as a reader, learning about the medium of reading (i.e., the authored text), and learning through reading are inseparable. By including teachers' beliefs about text in our exploration, we aimed to gain further entry into their beliefs about the nature of reading. Similarly, we considered teachers' beliefs about what it means to learn from text to be integral to their view of reading. We also acknowledge that reading involves a web of cognitive, motivational, physical, and sociocontextual factors (Alexander & the Disciplined Reading and Learning Research Lab [DRLRL], 2012; RAND Reading Study Group [RRSG], 2002). Further, we view reading as a capacity and a set of attitudes acquired over time, changing across the lifespan, and extending well beyond basic linguistic processes. As a consequence, we believe that teachers' characterization of the developmental nature and trajectory of reading is a key component of their beliefs about reading. We therefore considered any teachers' beliefs about the aforementioned aspects (nature and development of reading; factors influencing reading; nature of text; and interactions among reading, text, and learning from text) as indicative of their beliefs about reading. We did not delve into the role of teacher knowledge as distinct from or nested within their beliefs about reading, given the focus of the handbook and our space limitations.

Methods

We identified relevant empirical studies by searching two databases: PsycInfo and ERIC. We searched for articles in peer-reviewed journals that included reference to the terms "teacher* belief* reading." We did not limit the search to a specific time period, because we wanted to capture, if possible, the historical trajectory of this research. The search produced 683 articles. A further search for "teacher* belief* text*" produced a modest overlapping of results, but no additional relevant articles.

Our second step was to examine the abstracts of these articles. After weeding out studies that were clearly not pertinent (e.g., teachers' perceptions of what needs to be changed in low-performing schools or parental beliefs from the perspective of teachers) or that did not directly address teachers' beliefs related to reading (e.g., teachers' beliefs about bilingualism; teachers' beliefs about low-performing students), we retained 94 studies.

To gain a broader perspective about the development of the field's understanding of teachers' beliefs about reading and to triangulate the view emerging from the analysis of empirical findings, we also searched handbooks reviewing the status of the reading field. These sources suggested a few additional studies or reviews that we found useful. We did not find any handbook chapter specifically addressing teachers' beliefs about reading; the discussion of the topic was usually embedded within a broader, more general issue, and often confined to a few paragraphs or brief sections. Although we do not claim to have conducted an exhaustive review of potentially relevant secondary sources, we did find a consistent overlap between the empirical evidence cited in these sources and what emerged from our search of the literature. Thus, we believe that what we sampled can be considered fairly representative of what is available in the vast reading literature.

In the next sections, we summarize the outcome of our exploration (topics, questions, and findings emerging from relevant literature) and discuss what we perceive as general strengths and weaknesses of such investigations. Then, in light of this body of literature and our view of reading, we advance a few recommendations regarding classroom practice and teacher education, and suggest possible directions for future research.

REVIEW OF RELEVANT LITERATURE

Beginning in the 1970s, the teacher education literature began to include studies exploring teachers' conceptions of what reading is, how it develops, how it can better be fostered, and about congruence between teachers' beliefs and pedagogical practices used in the classroom (Barr, 1984). Such attention was made possible by a theoretical shift taking place among researchers and educators. More specifically, it was an expression of the move from a behaviorist view of teacher education as the transmission of a well-defined body of additive knowledge to a cognitive/constructive perspective that acknowledged the active role of the teacher/learner in the acquisition of professional knowledge and the function that teachers' prior knowledge and beliefs play in learning and in interpreting educational exchanges (Harste & Burke, 1977; Risko et al., 2008). Studies published in the 1980s and 1990s often conveyed a view of teachers' beliefs as potential factors in teachers' decision-making processes (e.g., Borko, Shavelson, & Stern, 1981; Kinzer & Carrick, 1986) and emphasized the importance of teachers' reflection on their beliefs as a way of fostering or sustaining desirable pedagogical changes (Olson & Singer, 1994) or investigated the relation between teachers' beliefs and their preferred pedagogical practices (e.g., Moore, 1986; Richardson, Anders, Tidwell, & Lloyd, 1991; Rupley & Logan, 1986).

Beliefs About Reading Instruction

Studies addressing teachers' beliefs about how reading can be fostered are the majority of those we review. Participants in these studies were almost exclusively elementary teachers, for the most part females. We identified only one study involving secondary teachers (Olson & Singer, 1994) and one study including middle-school teachers (Norby et al., 1991).

In the 1980s and 1990s, most studies addressing these beliefs sought to determine where teachers' beliefs would fall along two theoretically derived continua. The first continuum regarded the grain size of the unit of language (e.g., syllables, words, sentences) teachers believed should be the main focus of their pedagogical efforts; the second regarded the overall focus of teachers' pedagogical attention, either the content to be transmitted via instruction or the student (Snow & Juel, 2005). The instrument used to assess the first set of beliefs was the DeFord Theoretical Orientation to Reading Profile (TORP; DeFord, 1985). Designed on the basis of a categorization of extant instructional programs in reading (i.e., basals), the TORP identified three main theoretical orientations to reading instruction: (a) phonics orientation, which first emphasized sub-word level language units and over time shifted the focus to whole words and comprehension; (b) skills orientation, which focused on the acquisition of sight words and on the use of better quality stories as more words

were incorporated; and (c) whole-language orientation, which privileged the development of a sense of story/text as a way to deal with smaller units of language and introduced high-quality literature from the outset.

The Propositions about Reading Instruction Inventory (PRI; Duffy & Metheny, 1979) intended to discriminate between teachers who viewed reading instruction as aiming at the development of impersonal, independent, linear skills and teachers who viewed reading instruction as aiming at the development of the student as a reader. Instruction focusing on the development of skills that could foster a procedural reading capacity was contrasted with instruction that built onto the mix of those personal aspects (cognitive, motivational, and sociocultural) that enable a person to develop as a reader. The former privileged the use of basal texts (content-centered approach); the latter centered their attention on student interest, natural language development, and integration of reading with other curricular components (student-centered approach).

A few studies also suggested that teachers' beliefs about reading were more complex and nuanced than what extant inventories captured. Teachers' beliefs seemed to change according to the context of reference, which raised questions about the capacity of Likert scale inventories to capture their complexity and suggested the appropriateness of mixed-method approaches. For example, in their interviews with teachers, Olson and Singer (1994) found that teachers often used qualifiers when responding to forced-choice items in the questionnaires.

A few studies focused more specifically on teachers' beliefs about reading comprehension. For example, Norby and her colleagues (1991) explored what 311 elementary and middle school teachers believed reading comprehension instruction to encompass. Surprisingly, they found that teachers perceived almost all instructional behaviors as instruction in comprehension (e.g., assessment, prediction, application, review of and help with assignments, study skill, and decoding). Especially noteworthy was the overwhelming belief that *assessing* comprehension (through questioning and reviewing) was a way of *providing instruction* in comprehension (see also Concannon-Gibney & Murphy, 2010; Ness, 2009; Ulusoy & Dedeoglu, 2011).

The shift in the reading community from a mainly cognitive view of reading to frameworks explicitly considering its motivational components (e.g., RRSF, 2002) is reflected in a recent line of inquiry exploring elementary and middle-school teachers' beliefs about student motivation for reading and what aspects of student motivation were especially targeted by their instruction (Quirk et al., 2010). Results indicated that teachers believed that intrinsic factors were most important in driving student motivation and that providing challenging material and establishing the value and importance of reading were key components of reading instruction.

Relation Between Teachers' Beliefs and Practice

Studies using the teachers' beliefs inventories (TORP and PRI) explored the potential influence of teachers' beliefs on practice by studying the relation of teachers' scores on one or both of the orientation inventories and their practices and attitudes. Among the practices whose relations with beliefs were explored were: the quality of feedback provided to students (Hoffman & Kugle, 1982); teachers' perception of the importance of teaching students to draw conclusions, make inferences, gain literal comprehension

of information, and decode text (Rupley & Logan, 1985); teachers' beliefs about what constitutes effective student engagement practices (Duffy & Anderson, 1984); and promotion of student autonomy (Berglund, Raffini, & McDonald, 1992; Morrison, Wilcox, Madrigal, Roberts, & Hintze, 1999).

Overall, teachers' beliefs do appear to influence pedagogical choices, but such effects seem to be moderated by several factors (Barr, 1984; Hoffman, 1991/1996). For example, during oral reading, teachers reporting a whole-language, child-centered view of reading avoided correcting miscues that did not alter meaning, waited longer before providing feedback, and focused on contextual information to foster understanding (Hoffman & Kugle, 1982). Yet, Hoffman and Kugle found that teachers reported that the broader situation and the needs of the specific student would also influence their behavior.

Researchers found positive correlations between whole-language approach orientations (as assessed by TORP) and preference for student-centered pedagogical practices, as assessed by PRI (Hoffman & Kugle, 1982) or by the Pupil Control Ideology Form (Morrison, et al., 1999). Teachers expressing these beliefs were also more likely to view the development of reading as going beyond fluency, and to state their preference for activities aimed at promoting students' engagement with meaningful texts and for teacher feedback designed to sustain students' meaning-making processes (Hoffman & Kugle, 1982; Rupley & Logan, 1986). These studies took a clear stance in favor of whole-language approaches to the teaching of reading, which influenced the focus of their research. The studies also tended to blur the distinction between beliefs about reading, how to best foster reading, and generic appeals to constructivist theories of learning.

Kinzer and Carrick (1986) suggested that broader orientations may not predict specific pedagogical choices, which may, in fact, be more related to particular subsets of beliefs. With regard to feedback, whether teachers conceptualize reading as mainly a top-down, bottom-up, or interactive process may be especially influential, while beliefs about how reading develops (as the acquisition of linear skills or as a holistic process) are likely to affect the overall instructional approach. This finding was supported by Richardson and her colleagues (1991), who found a remarkable consistency between teachers' beliefs and practice once teachers' beliefs were classified on two dimensions: development of reading as skill or literature, and locus of meaning in the text or in the interaction between reader and text. Disagreements between beliefs and practice were more common for teachers who expressed inconsistent beliefs or were perhaps changing their beliefs.

Teachers expressing inconsistent beliefs also tended to apply socially acceptable practices in superficial ways. Sometimes, what teachers reported they *would* do was consistent with their reported beliefs, but inconsistent with what emerged from classroom observations (Wilson, Konopak, & Readence, 1992). For example, the teacher might consistently indicate preference for statements that reflect a reader-based, interactive view of reading and even organize the classroom environment in ways that facilitate discussion and showcase student interpretation of literary works. Yet, observations showed that she maintained an overall teacher-centered approach, characterized by extensive use of read-aloud followed by question-response exchanges between teacher and students (Wilson et al., 1992). On the other hand, Berglund and Raffini (1992) reported overall inconsistencies between teachers' beliefs and practice, but they used only the TORP to assess beliefs.

For preservice and novice teachers, reported beliefs tended to align with the views espoused by their respective programs, while their practice was mostly determined by their readiness to implement the new approaches within the complex classroom context (Moore, 1986; Theriot & Tice, 2009). Characteristics of the pupils, constraints imposed by the school system, and alignment with the culture of the specific school in which these teachers taught also influenced their practice (Duffy & Anderson, 1984; Grisham, 2000; Mitchell, Konopak, & Readence, 1991). Conversely, researchers also found teachers who consistently translated their beliefs into practice even when the context was not favorable (Grisham, 2000; Mitchell Davis & Wilson, 1999; White, Sturtevant, & Dunlap, 2003). Consistency was especially high for secondary teachers who expressed a reader-based view of the reading process (Konopak, Readence, & Wilson, 1994). When asked to choose among sets of lesson plans on decoding, vocabulary, and comprehension instructions designed to align with text-based, reader-based, and interactive beliefs, these teachers tended to choose reader-based plans. More specifically, they chose plans emphasizing that students bring meaning to the text and use their prior knowledge to build understanding, while the teacher models and guides the lesson. The need to shift control from teacher to students appeared to be one of the most common causes of inconsistency between professed and enacted teachers' beliefs. It is possible that the teacher control allowed even by lesson plans categorized as reader-based in this study contributed to its finding of high consistency between beliefs and practices.

Factors Influencing Teachers' Beliefs

Another subset of studies focused on factors influencing preservice and inservice teachers' beliefs about reading instruction. These factors included features of the instructional context, such as student characteristics, need for routine or structure, and characteristics of available basals (Duffy & Anderson, 1984). Yet, whatever the basal adopted, Shannon (1989) found that primary teachers believed such instructional material was necessary for teaching reading and was based on scientific investigations of the reading process. Other factors influencing teachers' beliefs were the grade taught, undergraduate reading methods courses taken, and years of professional experience (Richards, Gipe, & Thompson, 1987).

Since the end of 1990s, the influence of undergraduate reading methods courses has been studied in the context of a line of research which sought to gauge the effectiveness of undergraduate programs in fostering adaptive beliefs (Anders, Hoffman, & Duffy, 2000; Dillon, O'Brien, Sato, & Kelly, 2011). Reading researchers have thus increasingly shifted their focus to preservice teachers' beliefs about reading. They employed a variety of methodological approaches, revising prior inventories to reflect contemporary trends in reading orientations and curricula (Knudson & Anderson, 2000) and using qualitative methodologies (e.g., open-ended interviews or observations) to capture preservice teachers' beliefs in their own words (Barnyak & Paquette, 2010; Linek et al., 1999; Linek et al., 2006).

In these studies of the influence of undergraduate programs, preservice teachers' beliefs were represented along slightly new continua, such as the contrast between viewing reading as the acquisition of skills or as engagement in a process requiring the development of strategies. Another contrast in beliefs about teaching reading

was between views of “teaching as telling” and views of “teaching as modeling.” Shaw and Mahlios (2011) found that students entering a reading methods course conceived of literacy instruction variously as nurturing, bringing together different parts/components, exploring, taking on a worthwhile challenge, and helping students to learn a skill. At the end of the two-semester course, the majority of students chose the “*parts*” metaphor as most illustrative of their beliefs about teaching literacy, but some likened teaching literacy to *nurturing* and *exploring*.

In general, researchers found that educational interventions can affect teachers’ beliefs, especially if they provide the opportunity to put into practice the ideas proposed in the courses. For preservice teachers, this may happen through the combination of theoretical method courses with some form of practicum (e.g., tutoring, internships), which facilitates the integration of teachers’ personal, professional, and practical knowledge (Duffy & Atkinson, 2001; Linek et al. 1999). Similarly, full-immersion professional development programs that let inservice teachers experience the difference new approaches to reading made for themselves as readers while also experimenting with the new pedagogical practices in their classrooms seemed to be successful in shifting teachers’ attitudes (Asselin, 2000; Brady et al., 2009; Socol, 2006). However, these changes in teachers’ beliefs were often inferred by changes in their practice, or reported practice, rather than being directly assessed.

Providing teachers with ample opportunities to reflect on their beliefs emerged as critical for fostering belief change (Anders & Bos, 1992). Yet, research on preservice teachers (Grisham, 2000) suggests that individuals may change some of their beliefs (e.g., embrace beliefs compatible with the constructivist tradition) and yet still cling to views about reading that are fundamentally incompatible with the beliefs justifying their practice (e.g., reading as surface understanding and enjoyment). One effect of espousing inconsistent beliefs is superficial, technical implementation of the practices proposed by the programs (Richardson et al., 1991), which might not be detected by a research design based on self-report.

The larger-scale influence of reading-related theory and research on inservice teachers’ beliefs and practices has also been investigated. During the “reading wars” between the phonics and whole-language perspectives on beginning reading instruction, a comparative study investigating changes in elementary teachers’ belief and practice in U.S. and Australian classrooms found that, despite the controversy characterizing the research literature of the period, little had changed during the prior 15 years (Berglund & Raffini, 1992). If anything, the overall approach to reading instruction had tended to become more rigid and structured in both countries.

Such a gap between research trends and practice also emerged more recently. In a study of 121 first-grade teachers, Cunningham, Zibulsky, Stanovich, and Stanovich (2009) found that teachers’ beliefs about how to best allocate instructional language arts time did not reflect the balanced approach suggested by nationally endorsed guidelines; the amount of time that these teachers believed should be optimally devoted to explicit and systematic instruction in phonics for these beginning readers was particularly low. Similarly, a study of 340 Australian primary teachers found a moderate preference for holistic (versus code-based) instruction and overall low metalinguistic knowledge (Fielding-Barnsley & Purdie, 2005). Considered within a broader historical context, these results suggest that developments in educational research (both preferred theoretical frameworks and empirical findings) have a

moderate, delayed influence on teachers' beliefs. Changes initiated at the national curricular level did not seem to influence teachers' beliefs much faster, either. In Ireland, a survey of primary teachers found a widespread focus on word attack and decoding together with a lack of instruction in reading comprehension, despite the government's issuance of a new curriculum advocating a balanced approach to reading instruction a decade prior (Concannon-Gibney & Murphy, 2010).

Beliefs About What Reading Is and How It Develops

Only a small subset of studies reviewed directly investigated teachers' beliefs about how reading happens (or, what reading is) and how it develops. These studies again involved preservice (i.e., elementary education undergraduates) or inservice elementary teachers, which confirms the emphasis placed by reading scholars on younger children, and on the acquisition of fundamentals of text processing (Fox & Alexander, 2011). Participants, again, were mainly female.

Teachers' beliefs varied in the relative predominance of the text or the reader in determining meaning, with some teachers clearly locating meaning in the text or in the reader and a few teachers viewing reading as a transaction between a reader and a text (Kinzer & Carrick, 1986; Richardson et al. 1991; Risko et al., 2008). Preservice teachers also differed in their view of the development of reading as mainly reflecting the acquisition of an additive set of skills, as the development of strategies, or as increasingly active engagement with text (Linek et al., 1999; Moore, 1986). More recent studies exploring preservice teachers' metaphors of literacy found that the view of reading as a sequence of knowledge and skills, as parts that come together as a whole, and as an exploration consistently emerged from the analysis of participants' responses (Shaw & Mahlios, 2008, 2011).

Studies addressing teachers' beliefs about content area reading extended the exploration of teachers' beliefs about reading to include also middle and secondary-school teachers. Four main findings seem especially relevant for the questions explored in this chapter. First, not only primary but also most secondary teachers (preservice or inservice) seemed to conceptualize reading as a set of basic skills, acquired in the primary grades or through remedial programs taught by reading specialists (Hall, 2005; O'Brien & Stewart, 1990). Reading and learning from text were therefore perceived by teachers as different experiences, even though interventions were implemented to shift these perceptions (e.g., Bean, 1997; Cantrell, Burns, & Callaway, 2009; Dupuis, Askov, & Lee, 1979; O'Brien & Stewart, 1990). In other words, learning to read was conceptualized as distinct from reading to learn (Gillespie & Rasinski, 1989).

Second, the idea of reading to learn, when emerging at all, was restricted to vocabulary development and comprehension, which, in turn, tended to be reduced to reproducing and organizing information extracted from text (Bean, 1997; Konopak et al., 1990; Ulusoy & Dedeoglu, 2011). With the exception of the activation of prior knowledge, which seemed to serve mainly motivational purposes (Rich & Pressley, 1990), comprehension strategies in the content areas were often seen as a means to enable students to acquire new content in a given discipline. The preference accorded to strategies such as vocabulary building and organization of content through graphic organizers suggests a view of reading in which texts are conveyors

of information and readers are diligent extractors and organizers of such information (Fisher & Frey, 2008; Ness, 2009).

Third, the idea of content area reading as the development of sensitivity to the specific disciplinary structure of text and discourse was largely absent, both in teachers' emergent conceptualizations and in the studies' overall theoretical frameworks (e.g., Cantrell, Burns, & Callaway, 2009; Freedman & Carver, 2007; Gritter, 2010). What teachers reported to be the most commonly used "reading" strategies (e.g., copying notes from the board or producing simplified texts) focused on their informational content rather than supporting student interaction with typical content area texts and their disciplinary demands (Lewis & Wray, 1999; Wade & Moje, 2000; Walker & Bean, 2005). The belief that development of reading in the content areas includes becoming attuned to the specific structure of typical disciplinary texts surfaced only from teachers participating in a study of reading within vocational classes (Darvin, 2006).

Finally, especially in the primary grades, the idea of reading tended to be associated with narrative texts, with teachers perceiving the informational nature of content area textbooks as a "problem" to be addressed by shifting to a narrative style (Shymansky, Yore, & Good, 1991). In the secondary grades, the identification of reading purpose with pleasure or escape explained the differences in attitudes toward content area reading between an English preservice teacher and teachers in other disciplines, although all seemed to identify content area reading with a set of "disciplinary-free" strategies (Bean & Zulich, 1990).

Teachers as Readers

Several studies explored how teachers viewed themselves as readers. Researchers' interest in this question mainly rested on the assumption that being a good reader is necessary for being (or becoming) a good reading teacher, capable of communicating a life-long love for reading (Cramer & Castle, 1994). The attitudes and behaviors that teachers and researchers associated with good reading provide evidence regarding their beliefs about reading, text, and learning for text, although this body of literature seldom referred explicitly to teachers' beliefs.

Throughout these studies, reading seemed to be conceptualized as a potential dimension of the self. At a minimum, studies attempted to assess how often and how much teachers read and how relevant the experience of reading was in their daily lives in comparison to alternative uses of their time (McNinch & Gruber, 1992; Morrison, Jacobs, & Swinyard, 1999; Nathanson, Pruslow, & Levitt, 2008; Sulentic-Dowell, Beal, & Capraro, 2006). Personal engagement with text seemed to be reduced to an enjoyable, yet mainly emotional reaction (Draper, Barksdale-Ladd, & Radencich, 2000), while an appreciation for the complex, evaluative, and critical dimensions of reading seemed lacking. Good readers identified themselves as such mainly due to their love for popular fiction, magazines, and newspapers, but reading was not perceived as a way to build their own knowledge (Benevides & Stagg-Peterson, 2010). For example, after college, teachers did not use professional literature as a way to increase their understanding of the issues they encountered in school (Grisham, 2000).

With few exceptions, reading for information and academic reading were not associated with enjoyment and were downplayed even by self-perceived "good readers"

(Daisey, 2009). The relation between reading and learning was perceived as tenuous, at best. Although many studies advocated for literacy practices that might foster life-long reading habits (e.g., silent, sustained personal reading; teachers' reading aloud; use of literature for instructional and recreational purposes), explicit connections with content areas were generally absent from the frameworks used by researchers to explore how teachers view themselves as readers (e.g., Draper et al., 2000; Grisham, 2000). Similarly absent were suggestions that such practices will happen in the context of an overall education about how to interact meaningfully with texts. For example, instruction in reading strategies did not appear to be perceived as a means to deepen the reading experience; rather, the texts currently read appeared to be used as providers of situational interest for an otherwise perhaps unpleasant, academic activity (Morrison, Jacobs, & Swinyard, 1999).

In his study of preservice teachers, Gupta (2004) found that a large majority of participants perceived reading for pleasure and reading for information as dichotomous activities. One unfortunate consequence was that even preservice teachers who successfully used a variety of reading strategies with narrative texts were at a loss when they had trouble in comprehending informational texts assigned in their classes. Once the goal of reading shifted to memorization, these preservice teachers saw the meaning as entrenched in the text and their role as readers became to locate and extract such meaning by paying close attention to each individual word; the more flexible and effective reading strategies they commonly employed while reading for pleasure did not transfer to the academic context.

Conversely, a few studies used theoretical frameworks that conveyed a richer view of reading, although the teachers' reading experiences that emerged from the studies rarely mirrored these richer views. For example, Theiss, Philbrick, and Jarman (2009) investigated preservice teachers' perceptions of reading maturity. On average, preservice teachers reported that they enjoyed reading, had a purpose for doing so, perceived themselves as proficient readers, and tended to use their prior knowledge and experiences to understand the texts and form new understandings. But, at the same time, they did not seem to perceive reading as a transformational act, which can foster reflection and thus influence the self. Similarly, a very small subset of preservice teachers in Gupta's study (2004) described reading as an active engagement with the text, where task requirement, text difficulty, and prior knowledge influenced the strategies used. Only one preservice teacher described reading as a conversation with the author, an exchange to which she was contributing her point of view.

REFLECTIONS ON OUR FINDINGS

Strengths and Weaknesses of Identified Literature

Considered chronologically, the questions investigated by the studies show that research on teachers' beliefs about reading was clearly positioned within the theoretical frameworks that came to characterize the evolution of the broader reading field. Beginning in the 1970s, the shift from a behavioral to a cognitive perspective, which brought attention to teachers' beliefs in the first place, moved the emphasis onto readers and their responses to texts (Asselin, 2000). Yet, the reader's role remained heavily constrained as long as texts were conceived as informational conduits rather

than literary works (Fox & Alexander, 2009; Rosenblatt, 1978/1994) and inasmuch as content to be transmitted rather than students took center stage in the classrooms. Whole language, literature-based, and student-centered approaches stemmed from these new theoretical understandings (Asselin, 2000), as did the attempts to assess and to shift relevant teachers' beliefs. The focus on reading comprehension and on how individuals build mental representations of text content and text meaning (RRSG, 2002) spurred interest in teachers' beliefs about strategy use, and the corresponding reading theories served as theoretical frameworks for several studies investigating beliefs about content-area reading.

Yet, despite such theoretical ties, this body of research focused mainly on pedagogical beliefs, skirting core beliefs about the nature of reading, of text, and of learning from text (Anders & Evans, 1994). With very few exceptions, the epistemological aspect of the reading act was not considered, although research suggests that beliefs about the nature of text and of the knowledge that can be derived from text deeply influence the reading experience and its outcomes for the reader (Shanahan, 2009). This was especially clear in the context of content-area reading beliefs, where beliefs about learning from text were addressed, but no consideration was given to the disciplinary space in which these texts had been generated and were read. As a result, although this body of research remained clearly connected to the classroom environment and teacher education programs, it rarely allowed a glimpse of core components of teachers' beliefs about reading that might influence practice and thinking in schools (Anders, Hoffman, & Duffy, 2000; Bendixen & Feucht, 2010; Brownlee, Schraw, & Berthelsen, 2011). Conversely, this approach seemed to go hand-in-hand with educational interventions that similarly avoided addressing the very nature of reading and of text.

From a methodological standpoint, limitations in the beliefs considered were evident in the questionnaires widely used in quantitative studies (i.e., TORP), while analyses in qualitative studies tended to be constrained by research questions investigating teachers' beliefs about pedagogical practice apart from their potential connections with beliefs about reading and text. Generalizability of results was also affected by the overrepresentation of primary grade teachers in the samples, which may have further focused this body of research on beliefs regarding early phases of reading development.

Implications for Classroom Practice and Teacher Education

The views of reading that emerged from the studies signal a few common trends that we see as especially problematic for what they may imply for reading education. First, reading tends to be characterized as one-dimensional. The cognitive, the affective, or the social dimension is viewed as the single factor that defines the reading experience and drives the pedagogical effort. For example, views highlighting the cognitive dimension tend to reduce reading to a set of basic skills or decontextualized strategies that foster, at best, the analytic component of reading but have little relation with learning or with any broader purpose pursued by the reader. Acquiring the skills or developing familiarity with specific strategies become ends in themselves, rather than the means to achieve depth and richness of understanding across a variety of texts and contexts, accessed for meaningful purposes. Conversely, those views that underscore the affective dimension of reading and call for literature-based

curricula tend to overlook its analytic component by focusing almost exclusively on the intensity of the aesthetic experience that reading can evoke.

Teachers may shift views according to the reading context, focusing on factual understanding when dealing with nonfictional texts (typical of content area reading) and on emotional response when reading fiction (Anders & Evans, 1994). In neither case is reading viewed as a potentially transformative act able to affect the self by spurring learning and eliciting reflection (Fox, 2012). At best, it is seen as an activity that can generate an intense emotional experience in which the self, although immersed, gets paradoxically lost, or as a process that can add bits of information to the reader/processor's prior knowledge. We found the emphasis on fiction a very suggestive indication of the former attitude, while the focus on vocabulary development and organization of information in the content area reading literature exemplifies the latter.

Further, this reduced conceptualization of the reader goes together with a view of text as authorless (Fox, 2012). Thus, the view of reading that emerged from the literature resembled more a soliloquy than a conversation between a reader and a writer. With the voice of the author obliterated, the reader's response was reduced to feelings or to mental transcriptions of the text. This view may contribute to explaining why the critical/evaluative dimension of reading rarely, if ever, emerged. If texts do not convey someone's thoughts but instead are the medium for providing information or vicarious experience, there is little room for evaluation.

Finally, a belief in the developmental nature of reading did emerge from the literature we reviewed and was mostly articulated as a shift from learning to read to reading to learn. We have discussed elsewhere the issues that arise from viewing these aspects as dichotomous and typical of a specific developmental level (Alexander et al., 2011; Fox & Alexander, 2011). In regard to teachers' beliefs, such a dichotomous view of reading went together with a stunted view of learning via reading. More specifically, in the primary grades, where reading was characterized as "learning to read," learning was reduced to the acquisition of basic skills such as decoding and fluency, with little interest focused on what readers could learn from the words once read. When considered in the context of content areas or in relation to older students, reading to learn was often equated to extraction, with texts still viewed as authorless and disciplinary discourse mostly sidestepped. Such a view of learning contrasts deeply with the accounts provided in the literature on the development of expertise and learning within academic domains, including reading, especially in regard to the role that epistemic beliefs play in learning (Alexander et al., 2011). If what is suggested by this body of research aptly reflects core components of learning, beliefs about the nature of text and learning from text should be similarly emphasized in teacher education programs and professional development interventions. Devoid of such grounding, beliefs about best pedagogical practices easily give way to superficial implementations of even the best intentioned, research-inspired reform efforts (e.g., Flint, Maloch, & Leland, 2010; Richardson et al., 1991).

Implications for Research

Our recommendations for future research closely derive from the considerations in the prior sections, coupled with our understanding of trends in current research on the influence of teachers' beliefs on instruction and of epistemic beliefs on reading

and learning from text. We believe that investigations of teachers' beliefs need to be extended to explicitly address beliefs about the nature of reading, the nature of text, and learning from text. We also believe that research in this area can benefit and would benefit from understandings generated in the context of disciplinary learning and thinking, expanding the exploration of what it means to read within the various content areas and what may be implied in terms of pedagogical practice.

Given the difficulties inherent in capturing and assessing beliefs, this area of research will profit from the employment of a variety of methodologies, within and across the studies. Several suggestions have been offered in Section II of this handbook. Together with expanding current understanding of teachers' beliefs about reading, assessing the efficacy of teacher education and professional development programs in promoting beliefs compatible with pedagogical practices that sustain the development of students' reading competence is also an important focus of research. In this respect, the field could greatly benefit from more rigorous designs that improve the internal validity of the study (e.g., pre-test, post-test designs; use of control groups). Extending the study of teachers' beliefs to their relation with students' beliefs and students' outcomes would also greatly contribute to our understanding of the potential influence of this factor.

In this area, researchers are often also teacher educators. Several studies were efforts to assess and to reflect on the effectiveness of reading methods courses attempting to shift preservice teachers' beliefs (Anders, Hoffman, & Duffy, 2000). In most cases, researchers reported success in shifting their students' beliefs. Thus, how these researchers conceptualize the object of their research and the questions that they ask may have an especially direct influence on practice. We believe that, by acknowledging the multidimensional and interactional nature of reading, researchers and teacher educators will take an important first step toward creating the conditions in which reading can be encountered as a rich, personally relevant experience by teachers and their students; not a minor accomplishment, given that written texts have played and continue to play a fundamental role in conveying human memories, experiences, and understandings across time and space.

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21

SCIENCE TEACHERS' BELIEFS

Perceptions of Efficacy and the Nature of Scientific Knowledge and Knowing

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As we write this chapter, teachers across the United States are preparing for their first days of school. Besides the excitement associated with teaching students who are newly energized after a long summer break, science teachers also come into the school year with a host of beliefs that may well shape the ways in which they teach and may ultimately have some bearing on their students' overall experiences with science. Although there are countless beliefs that teachers hold with regard to science, in this chapter we focus specifically on two beliefs that have received the most research attention—teachers' self-efficacy, which describes their beliefs about their capability to teach science, and their epistemic beliefs, which describe their beliefs about the nature of scientific knowledge and knowing.

Science has been described by many as one of the most difficult school subjects (Drew, 2011; Dweck, 2006; National Academies of Science, 2011). For this reason, the National Academies of Science has noted that a strong sense of competence is critical for success in science and for persistence in science-related careers. For science teachers in particular, this same robust sense of competence is required both to understand science and to teach it well, as teachers who feel incompetent in science

are more likely to avoid teaching it (Grindrod, Klindworth, Martin, & Tytler, 1991; Skamp, 1995). Given the importance of competence beliefs in learning and teaching science, we focus on one of the most well-studied constructs dealing with this belief—teachers' self-efficacy for teaching science.

Besides self-efficacy, scholars and practitioners alike have documented the regrettable lack of sophistication that students have with regard to their basic scientific literacy. For example, many students in middle school believe that science is composed entirely of absolute truths (BouJaoude, 1996), and that the development of scientific knowledge leaves little room for creativity and imagination (Griffiths & Barman, 1995; Lederman & O'Malley, 1990; Smith, Maclin, Houghton, & Hennessey, 2000). These troubling cases can be traced to teachers not understanding the complex nature of scientific knowledge well enough to communicate that level of sophistication to their students (Brickhouse, 1990; Duschl & Wright, 1989; Hashweh, 1996; Keys & Bryan, 2001). They can also be traced to institutional structures, such as an undue emphasis on testing, which can lead some science teachers to avoid teaching about the complexities of science (Brickhouse & Bodner, 1992; Munby, Cunningham, & Lock, 2000).

The development of students' deep understanding and appreciation for the complexity of science starts first with teachers. Teachers must have a deep level of understanding about the complexity of scientific knowledge. That is, they must understand that knowledge in science is connected to other fields of knowledge; that scientific knowledge is often revised with new evidence; that scientists often disagree; and that scientific knowledge must be justified with evidence from multiple sources and multiple experiments. Teachers must also possess the self-efficacy to lead their students through learning activities that model that complexity. Being able to teach in such a manner is certainly no easy task. It requires substantial skills in planning and organizing. It requires teachers to possess excellent classroom management skills, the ability to engage and motivate students, as well as the ability to connect these rich learning activities to the standards on which students will be tested. Given these issues that science teachers must grapple with, we chose to study science teachers' self-efficacy and their epistemic beliefs about science.

THE NATURE OF SCIENCE TEACHERS' BELIEFS

Epistemic Beliefs

Because the construct of epistemic beliefs is discussed in depth by Lunn, Walker, and Mascadri (Chapter 18, this volume), we provide a brief background to the construct and provide a deeper look into how these beliefs are relevant to science teachers in particular. Although there is no single unifying framework that defines epistemic beliefs, models for the construct are generally either developmental in nature, emphasizing the qualitatively different stages or positions that individuals progress through, or stress the multidimensionality of the construct, in which "systems of beliefs" combine together along a number of related beliefs (for a review, see Hofer & Pintrich, 1997). In this chapter, because we focus on teachers' epistemic beliefs about science, we define the construct as the beliefs that teachers hold about the nature of scientific knowledge and knowing. In line with Hofer and Pintrich (1997), we

see epistemic beliefs as consisting of multiple, somewhat independently operating dimensions. This means that science teachers are able to believe, for example, that scientific knowledge comes predominantly from a knowledgeable “elite” (e.g., professional scientists). However, science teachers are also able to simultaneously believe that there can be multiple “right answers” to complex problems in science.

As for the multiple dimensions, for science teachers in particular, the construct refers to their beliefs about whether scientific knowledge is simple/certain (i.e., does scientific knowledge consist of isolated bits of unchanging truths or does it consist of interconnected ideas that can evolve?), whether scientific knowledge is handed down from an elite few (e.g., “real” scientists or other authorities like teachers or textbooks), and how experimental evidence and other pieces of evidence can be used to justify scientific knowledge. If, as the National Research Council (2011) recommended, one important goal of science education is to teach students to critically think about pressing scientific issues, then teachers also need to possess the sophisticated beliefs and competencies to engender the same level of sophistication in their students.

Teaching Self-Efficacy

The self-efficacy construct, which is addressed by Siwatu and Chesnut (Chapter 12, this volume), is especially relevant to science teachers, because science is often seen as a difficult subject for students to learn and for teachers to teach (Bursal, 2010; Buss, 2010; Drew, 2011; Johnstone, 1991). In general, self-efficacious teachers reflect on their experiences more adaptively, plan and organize more effectively, are more likely to employ and seek out engaging instructional strategies, put forth greater effort in motivating their students, and are more resilient when faced by obstacles than are teachers with lower self-efficacy (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998; Woolfolk Hoy & Davis, 2006). Given these benefits, researchers have begun to turn their attention toward the sources underlying teachers’ self-efficacy beliefs (Usher & Pajares, 2008). Bandura (1997) identified four sources of capability-related information: (a) *mastery experiences*, or individuals’ interpretations of their past performances, (b) *vicarious experiences*, in which individuals witness the successes and failures of others performing a task, (c) *social persuasions*, the messages that individuals receive about their capabilities, and (d) *physiological and affective states*, including stress, fatigue, anxiety, and mood. In this chapter, we review the literature on the sources and benefits of teachers’ self-efficacy beliefs specifically for those who teach science in elementary and secondary settings.

RESEARCH ON SCIENCE TEACHERS’ BELIEFS

Epistemic Beliefs

Given researchers’ and policymakers’ focus on teachers’ epistemic beliefs about science, we discuss the correlates of teachers’ epistemic beliefs as well as the variety of factors that influence the relationship between teachers’ epistemic beliefs and practices. In exploring the factors that moderate the relationship between epistemic beliefs and practices, we report on those factors that appeared in the literature most often.

Correlates of science teachers' epistemic beliefs. Teacher educators and educational psychologists would like to assume that beliefs translate into specific practices. However, the empirical evidence for this claim is mixed (Tobin, Tippins, & Gallard, 1994). On the one hand, Tsai (2006) showed that Taiwanese science teachers with more simplistic epistemic beliefs tended to focus their students' attention on test scores. They also dedicated more instructional time to teacher-directed lectures, tutorials, and exams. However, teachers with more constructivist epistemic beliefs tended to dedicate more time toward inquiry-oriented activities for their students and interactive discussions during class time. This suggests that teachers with more constructivist beliefs—those who believe that scientific knowledge is not just a collection of isolated facts, or that experiments are used merely to recreate what others have found—treat students as active co-constructors of knowledge. Teachers with more simplistic beliefs about scientific knowledge viewed students as more passive, and held the belief that knowledge should be transferred from teachers to students. In addition, Kang and Wallace (2004) found that teachers with simplistic beliefs about science tended to teach by transmitting information to students and using demonstrations as a way to illustrate a scientific concept rather than using demonstrations in a more inquiry-oriented fashion.

On the other hand, beliefs about the simple nature of science do not always translate into simplistic teaching practices, and beliefs about the complex nature of science do not always translate into correspondingly constructivist teaching practices. Therefore, researchers have come to believe that there are a number of variables that influence the degree to which teachers' beliefs about the nature of science match their teaching practices (Bell, Lederman, & Abd-El-Khalick, 2000; Lederman, 1992; Mansour, 2013). The discussion that follows deals with some of these factors.

Factors that modify the relationship between epistemic beliefs and practice. Mansour (2013), in a study with Egyptian teachers, found that, although there was a high degree of consistency between the belief in a simplistic nature of science and practices that reflected that simplistic notion, there was less consistency between constructivist beliefs and constructivist practices. Mansour posited that the dissimilarity in the degree of consistency between constructivist beliefs and constructivist practices resulted because forces greater than individual teachers (e.g., the Egyptian examination system) constrained teachers' beliefs in their ability to teach in a constructivist manner. In the same respect, Kang and Wallace (2004) found that, although teachers with simplistic beliefs did display practices aligned with these beliefs, teachers with more constructivist beliefs did not always teach in constructivist ways. Whether these constructivist practices emerged or not seemed more dependent on school context variables and other teachers' beliefs. For example, being constrained by having to teach material for tests was hypothesized to exert an influence on whether constructivist teachers' beliefs translated into practices that reflected that belief.

In another study, Waters-Adams (2006) found that, at the start of his observations, there was very little correspondence between science teachers' beliefs about the nature of science and their practice. However, by the end of Waters-Adams's

observations, these science teachers had “become more confident in their science teaching, displaying an ease that was not there before” (p. 930). These science teachers, therefore, began developing the self-efficacy to teach science in a way that aligned with certain aspects of what they believed was the most effective way to teach students. Although many of these teachers did hold simplistic beliefs that science knowledge was mostly a body of facts, the teachers ended up teaching in a much more constructivist manner because they held the belief that these scientific facts needed to be uncovered by the students themselves rather than dispensed by the teachers. It was not until these teachers developed the self-efficacy to implement the appropriate pedagogical strategies, however, that these constructivist practices became evident. One of Waters-Adams’s key implications was that student-teachers need to understand the nature of science, but they also need opportunities to enact their practices and observe their effects within a classroom. We posit that this aspect of student-teachers’ development—the opportunity to observe and reflect on how certain pedagogical strategies result in corresponding student outcomes—serves as a way to bolster teachers’ self-efficacy to teach science in a constructivist manner. We discuss this in more depth later.

Besides the studies mentioned above, others have found that the amount of support provided in a classroom can modify the relationship. For example, Stofflett (1994) showed that preservice teachers were less likely to translate their constructivist beliefs into corresponding practices if their cooperating teachers were unsupportive of it. Kaufman and Moss (2010) found that, unless teachers were able to maintain order and control in their classrooms, their constructivist beliefs were unlikely to be manifested in their practices. Therefore, as we describe in more depth later, unless teachers believe that they have the capabilities to implement inquiry science, their beliefs about the nature of science are not likely to translate into constructivist practices. Science teachers’ self-efficacy beliefs, therefore, are the subject of the next section.

Self-Efficacy

In this section we describe the antecedents and potential benefits of science teachers’ self-efficacy. In particular, we describe (a) the relationship between teacher’s self-efficacy and their effectiveness, (b) the sources of these beliefs, and (c) the role of context in the development and maintenance of science teachers’ self-efficacy beliefs. These themes have been the focus of much research because theory, teacher education, and professional development may be advanced by a better understanding of where these beliefs come from, how contextual factors influence them, and what influence they have on teacher quality and student achievement.

Influence on teacher effectiveness. In the domain of science, researchers have found that long-term research-based professional development programs have improved elementary teachers’ science self-efficacy and increased both the instructional time they spend on science and their use of inquiry-based, constructivist methods (Lakshmanan, Heath, Perlmutter, & Elder, 2011; Posnanski, 2002; Sandholtz & Ringstaff, 2011). Lakshmanan et al. (2011) reported that science self-efficacy was moderately correlated with use of inquiry-based methods. However, none of these studies provided evidence that self-efficacy mediated the relationship between

professional development and teacher behaviors. That is, more research is needed to document a causal link between science teachers' self-efficacy beliefs and their adoption of inquiry-based methods or increases in the amount of time they dedicated to teaching science.

It is also difficult to establish the existence of a causal relationship between self-efficacy and student achievement, particularly with regard to science. Lumpe, Czerniak, Haney, and Beltyukova (2012) found a significant and positive relationship between elementary teachers' science self-efficacy and the performance of both fourth and sixth grade students on science achievement tests. Angle and Moseley (2009), on the other hand, reported that, although self-efficacious high school teachers tended to believe that their students were well-prepared for a recently developed End-of-Instruction Biology 1 test, their students were no more likely to score at a proficient level on the test. That is, they found science teaching self-efficacy to be unrelated to how students performed on a cumulative test. Although scholars have found teachers' self-efficacy and student performance to be positively associated in other subject areas (Caprara, Barbaranelli, Steca, & Malone, 2006; Ross, Hogaboam-Gray, & Hannay, 2001), it is clear that the relationship between teachers' beliefs and students' outcomes is complex. Inferences drawn from such studies are not complete without a careful consideration of the factors that may mediate the relationship between science teachers' self-efficacy beliefs, their behaviors, and the behaviors of their students. Moreover, standardized tests are often a poor proxy for student learning (Braun, Chudowsky, & Koenig, 2010).

Sources of self-efficacy. Bandura (1997) hypothesized that self-efficacy is informed by at least four sources of information. Research on science teaching self-efficacy has focused most on the influence of *mastery experiences*, perhaps because Bandura argued that such experiences typically had the greatest effect on self-efficacy. In some studies, teaching experience has been used as a proxy for mastery experience (e.g., Cantrell, Young, & Moore, 2003; Cone, 2009). Some have documented that preservice teachers became more confident in early field experiences teaching science (Cannon & Scharmann, 1996; Cantrell, Young, & Moore, 2003; Cone, 2009). Liu, Jack, and Chiu (2007) also found that teachers who had taught science for eleven or more years had higher self-efficacy than those who had taught for ten or fewer. However, other researchers have reported no difference in teachers' science self-efficacy related to early field experiences or years of experience (Angle & Moseley, 2009; Yilmaz & Cavaz, 2008). These mixed results may reflect the fact that researchers did not account for whether these experiences were successful or not, an essential component of mastery experiences as described by Bandura (1997).

In general, positive past experiences with science and science instruction appear to have a more consistent influence on science teaching self-efficacy. For example, qualitative investigations have revealed that positive authentic science teaching experiences can be a powerful source of self-efficacy among preservice elementary teachers (Carrier, 2009; Gunning & Mensah, 2011). Preservice teachers who were more self-efficacious were also more likely to report having past positive experiences in science as K-12 students (Bleicher, 2004; Hechter, 2011). Mansfield and Woods-McConney (2012) found that other positive experiences with science during childhood, such as conducting science experiments at home, could influence primary teachers' science self-efficacy.

Mastery of science content also appears to have an influence on teaching self-efficacy. Preservice elementary teachers who had taken more college science classes were more likely to be self-efficacious when it came to teaching science (Bleicher, 2004; Bursal, 2010; Hechter, 2011). Even the number of science classes preservice elementary teachers completed in high school may influence their self-efficacy (Cantrell, Young, & Moore, 2003; Mulholland, Dorman, & Odgers, 2004). Teacher education and professional development programs designed to improve content knowledge have led to similar results. Elementary teachers who participated in professional development programs that emphasized understandings of science were subsequently more self-efficacious as science teachers and performed better on tests of content knowledge (Sandholtz & Ringstaff, 2011; Sinclair, Naizer, & Ledbetter, 2011). Similarly, preservice elementary teachers who enrolled in methods classes designed to support understandings of earth science demonstrated improved conceptual understanding and had higher science teaching self-efficacy (Bleicher, 2007; Bleicher & Lindgren, 2005). Liang and Richardson (2009) found that prospective elementary teachers who engaged in their own inquiry-based research projects had greater science teaching self-efficacy gains than did peers not engaged in such a project.

Of course, mastery of pedagogical skills is also important in the development of science teaching self-efficacy. Preservice elementary teachers in Palmer's (2006b) mixed methods study reported that learning how to teach their subject matter functioned as a powerful source of science self-efficacy. Moreover, when Palmer (2006a) interviewed preservice teachers nine months after completing a science methods class, many indicated that participation in a subsequent teaching practicum had reinforced their self-efficacy.

As previously mentioned, teaching experience in itself has an unreliable influence on teaching self-efficacy. The type of support preservice teachers receive during early field experiences may moderate this influence. Experiences that provide teachers with content knowledge, teaching strategies, and an opportunity to apply both in an authentic setting can have a powerful influence on teachers' self-efficacy beliefs. Such experiences have been found to improve science teaching self-efficacy in both teacher education contexts (Mulholland, Dorman, & Odgers, 2004; Swars & Dooley, 2010) and intensive professional development programs (Lakshmanan, Heath, Perlmutter, & Elder, 2011; Lumpe et al., 2012). Brand and Wilkins (2007) found that, upon completion of a science methods class, preservice elementary teachers were most likely to identify mastery experiences in the form of content or pedagogical knowledge as sources of their improved self-efficacy.

Teachers have identified many forms of *vicarious experience* in their early teaching endeavors. In Palmer's (2006b) study of preservice elementary teachers in a methods course, many participants described the mastery experience of learning pedagogical skills in a methods course in a manner consistent also with cognitive self-modeling. That is, not only did participants add to their arsenal of teaching strategies, but they also "could see" (p. 247) themselves using these strategies in their own classrooms. Bandura (1997) argued that such vicarious experiences, in which people envision themselves mastering a challenging task, can improve self-efficacy and future performance. Preservice elementary teachers reported higher self-efficacy following a science methods class in which they saw videos of master teachers, observed

science teachers in their field experiences, and took classes in which the instructor modeled effective teaching practices (Bautista, 2011). In follow-up interviews, participants identified these vicarious experiences as more powerful sources of their self-efficacy than the feedback they received or the experiences they had planning and implementing lessons in their field placements. Primary teachers in Mansfield and Woods-McConney's (2012) qualitative study spoke of the importance of seeing others perform successfully in scientific endeavors, even if on science television programs. In studies by Cone (2009) and Palmer (2011), preservice teachers identified vicarious experiences in the form of observing peers or college instructors as important sources of their self-efficacy, particularly in the absence of authentic teaching experiences. Indeed, as Bandura (1997) noted, vicarious information may be particularly important when the task is relatively novel and individuals have had few opportunities to evaluate their own capabilities. Less is known about how vicarious experiences may influence the self-efficacy of veteran teachers.

In some cases, modeling, or a lack of it, may have a negative influence on efficacy perceptions. In Mulholland and Wallace's (2001) case study, an elementary teacher in Australia recalled few experiences in which she had seen others teach science at her preservice field placement. And once employed, she found that other teachers often shared their own doubts and misunderstandings about their science instruction. In this way, it is possible that the low science teaching self-efficacy of others may actually be contagious—teachers who arrive at schools without adequate support in scientific content and teaching strategies may become less confident when surrounded by experienced teachers who are themselves less confident, and less competent, as science teachers.

Few researchers have explored *social persuasions* in the context of science teaching, but there is some indication that the messages teachers receive can serve as potent sources of their self-beliefs. Cone (2009) explored the self-efficacy of preservice teachers in a science methods course designed to provide them with mastery experiences, vicarious experiences, and social persuasions. The feedback teachers received following a simulated lesson was a powerful source for most teachers, and those who did not have opportunities to teach children rated such feedback as the most influential source of their self-efficacy. Similarly, Palmer (2011) found that inservice elementary teachers rated feedback from an outside observer as having the greatest impact on their science teaching self-efficacy following a professional development program that incorporated elements of all four hypothesized sources. In Mulholland and Wallace's (2001) case study, social persuasions—in this case, the apparent excitement and engagement of students during science lessons—provided a powerful source of self-efficacy for an elementary teacher as she transitioned from being a preservice to an inservice teacher. Given that success in teaching is largely dependent on the quality of social interaction between teacher and student, more research is needed to explore the implicit and explicit messages teachers receive from their students.

The relationship of *physiological and affective states* to teachers' beliefs about their ability to teach science is unclear. Preservice teachers who completed a science methods course with authentic teaching experiences were more self-efficacious, but were not significantly less anxious about science in general (Bursal, 2012). Few mentions of physiological and affective states have arisen in qualitative investigations of the sources of science teaching self-efficacy (Mulholland & Wallace, 2001; Palmer,

2006b; Palmer, 2011). However, it is possible that, when asked to self-report, teachers underestimate the influence of these states because the influence tends to be ongoing rather than episodic. And although researchers tend to focus on the negative impact of physiological and affective states, positive states may also influence science teaching self-efficacy, such as the “joy” described by a participant in Mansfield and Woods-McConney’s (2012) study when students “find out for themselves, especially for the first time” (p. 43).

Contextual factors. Teachers’ self-efficacy is sensitive to the context in which they are teaching. In their seminal article, Tschannen-Moran, Woolfolk Hoy, and Hoy (1998) noted that teaching self-efficacy “has been defined as both context and subject-matter specific. A teacher may feel very competent in one area of study or when working with one kind of student and feel less able in other subjects or with different students” (p. 215). In general, characteristics of a classroom, such as class size, ability grouping, and grade level, influence perceptions of teaching self-efficacy (Raudenbush, Rowan, & Cheong, 1992; Ross, Cousins, & Gadalla, 1996; Ross, Cousins, Gadalla, & Hannay, 1999). Andersen, Dragsted, Evans, and Sørensen (2004) examined how the self-efficacy beliefs of preservice Danish elementary science teachers changed over the course of their first year of teaching. They found that these changes were positively correlated with the presence of environmental factors (e.g., small class sizes, science instructional materials, technological resources) that they believed would enhance their teaching. In follow-up interviews, participants expressed concerns about the lack of instructional materials and time designated for science instruction but felt that support by other teachers was critical to their self-efficacy development. Lumpe, Haney, and Czerniak (2000) reported a moderate correlation between these context beliefs and the science teaching self-efficacy of K-12 teachers.

It is unclear what influence student background has on teachers’ beliefs about their science teaching abilities. In one study, preservice elementary teachers tended to be self-efficacious with regard to teaching students of different genders, socioeconomic backgrounds, ethnicities, and language backgrounds. However, when interviewed after their initial field experiences, they minimized the importance of student demographics to their effectiveness as science teachers (Settlage, Southerland, Smith, & Ceglie, 2009; see Gay, Chapter 25, this volume, for a possible explanation for this practice). On the other hand, experienced K-12 science teachers reported pedagogical discontentment when working with students who were different from them in some manner, such as students of different science backgrounds, different abilities, and English Language Learners (Southerland, Sowell, & Enderle, 2011). Moseley and Taylor (2011) also reported that middle and high school teachers in their sample, most of whom were White, were less confident in their ability to teach science when working in classrooms with larger numbers of African American, Latino, and American Indian students. However, Stipek (2012) found that, when other variables (i.e., perceived support from teachers and parents, socioeconomic status, grade-level performance) were held constant, elementary teachers’ general self-efficacy was higher in classes with larger numbers of African American and Latino students. Clearly, the relationship between teachers’ self-efficacy and students’ background is complex and likely dependent on a number of variables. If one of the goals of teacher education is to produce teachers who are culturally responsive, more research is needed that addresses teachers’ self-efficacy for teaching students of different backgrounds (Siwatu, 2011).

IMPLICATIONS FOR THEORY AND PRACTICE

Meaning Systems: The Interaction Between Epistemic Beliefs and Self-Efficacy

How might these two important constructs interact with each other and function within a larger network of beliefs? Nearly three decades ago, Piaget and Garcia (1989) argued that people develop one of two different conceptions of the world. He hypothesized that individuals' conception of the world then filters one's sensory inputs. One conception of the world is described as a relatively static view of the world. The other view of the world is one that is dynamic and constantly being created and transformed. Although Dweck and her associates have developed a robust line of inquiry positing two worldviews framed around conceptions of ability as either fixed or incremental (Dweck & Leggett, 1988), we believe that epistemic beliefs can also be considered a type of meaning system in a similar manner to implicit theories of ability.

Molden and Dweck (2006) posit a meaning systems framework in which an individual variable is not the sole contributor to behavior. Rather, implicit beliefs bring together clusters of related beliefs and goals, which together exert their influence on behavior. We argue that epistemic beliefs function in a similar manner. Figure 21.1 illustrates this hypothesized model. First, epistemic beliefs can be conceptualized

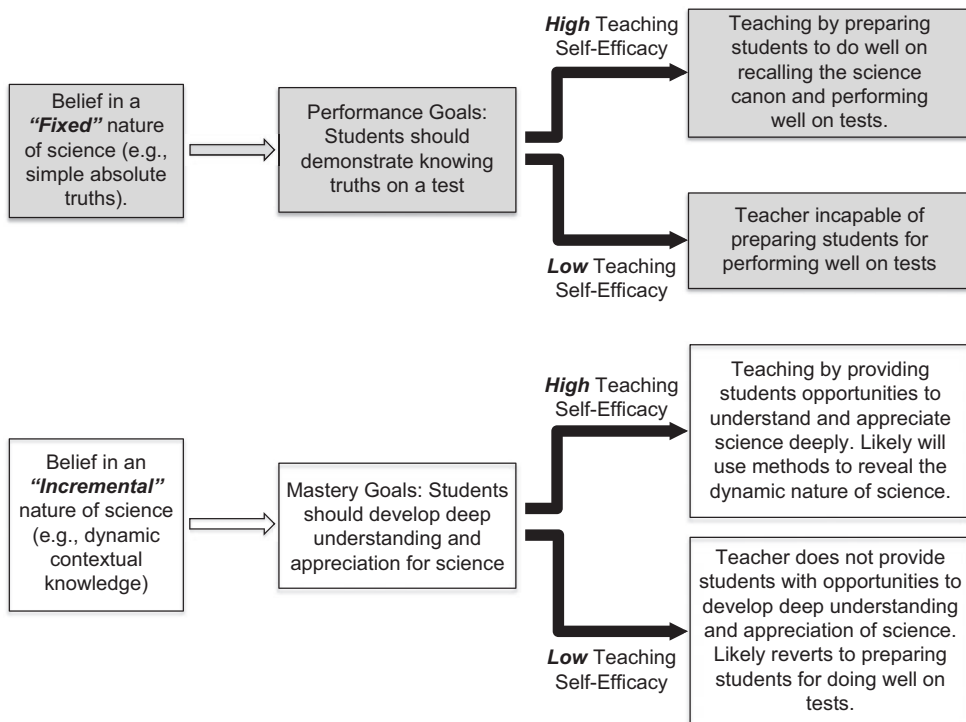


Figure 21.1 The meaning systems model showing the interactions between teachers' epistemic beliefs, teaching goal orientations, teaching self-efficacy, and teaching practices.

as individuals' beliefs about the static versus dynamic nature of scientific knowledge and knowing. For example, science can be seen either as a static collection of knowable absolute truths, or it can be seen as a dynamic and contextual body of knowledge.

Second, when individuals hold these conceptions of science as either static or dynamic, they tend to orient their goals toward either performance goals (i.e., teaching science topics so that their students can demonstrate competence in science) or mastery goals (i.e., teaching science topics with the goal to help students understand the complexity of science; Bråten & Strømsø, 2004, 2005; Chen & Pajares, 2010). And third, as in Dweck and Leggett's (1988) conception, self-efficacy serves as an important moderator of which types of behavior are ultimately manifested. For example, if teachers see science as mostly a collection of simple absolute truths, they may be more inclined to see their goal as getting their students to recall and demonstrate their scientific knowledge on tests. And if teachers are confident in their abilities to engage students and teach them these scientific truths (i.e., possess high science teaching self-efficacy), they are more likely to do an effective job at preparing students to perform well on these tests. Low teaching self-efficacy, however, is likely to result in ineffective teaching of the science canon.

On the other hand, if teachers see science mostly as a dynamic and evolving body of knowledge, they may be more likely to see their goal as providing students with opportunities to understand and appreciate the complexity of scientific concepts. Furthermore, if teachers believe that they are equipped with the necessary knowledge and skills to engage and teach students these dynamic scientific concepts, teachers are more apt to engage their students in more complex science activities that allow students to grapple with this complexity. However, if teachers lack the self-efficacy to engage students and teach them the dynamic and evolving nature of science, they are more likely to see their job mostly as depositing pieces of knowledge into students' minds.

This conception helps explain why teachers' beliefs about the simple nature of science translate into didactic practices, but beliefs about a complex nature of science do not necessarily translate into constructivist pedagogical practices. Science teachers' self-efficacy to engage and teach students to meaningfully grapple with the complexity of science moderates whether their beliefs about the complexity of science actually get expressed. Further research, of course, is needed to test this model with science educators.

Implications for Science Education

Taking a meaning systems approach to epistemic beliefs and self-efficacy can shed light on the professional development of science teachers. As shown in Kang and Wallace's (2004) study, teachers who held sophisticated views about science did not often translate those beliefs into practices that reflected those beliefs. What seemed to be the limiting factor was teachers' belief that they could not teach in a way that reflected the complexity of science. As Kang and Wallace and other researchers have shown, teachers' lack of self-efficacy to teach the complexity of science was attributed to institutional structures such as the burden to teach to a test or the lack of resources provided to science teachers. Researchers also identified personal factors

such as classroom management skills in explaining why teachers did not teach the complexity of science despite holding these sophisticated beliefs.

As Bandura (1997) argued, lack of resources, for example, does not in and of itself possess the “power” to prevent teachers from teaching a certain way. Rather, teachers’ beliefs in their efficacy to engage and teach students effectively are informed by the context of the situation (e.g., how much institutional pressure I have to teach to a test, or how many resources I am given to teach my students). Therefore, teachers’ self-efficacy for teaching science given their own individual context will likely influence teachers’ implementation of curricula that either support or thwart the development of students’ beliefs about the complexity of scientific knowledge, their appreciation for science, and ultimately their achievement in science.

Developing Science Teachers’ Practices

It is critically important to develop teachers’ conceptions about science and their self-efficacy for implementing curricula that help further students’ evolving conceptions about science. For this reason, teacher educators are faced with a substantial challenge: How can teachers develop both the beliefs and the practices that reflect the complex work of actual science professionals? Many who have investigated the effectiveness of teacher education and professional development programs have done so with the apparent assumption that changing teachers’ self-efficacy beliefs and their beliefs about the nature of science will lead to improvements in their instruction. Guskey (2002) challenged this notion, however, arguing that “significant change in teachers’ attitudes and beliefs occurs primarily *after* [emphasis added] they gain evidence of improvements in student learning” (p. 383). He proposed that professional development influences teachers’ beliefs primarily when it provides teachers with the tools to succeed in a classroom, which in turn lead to enduring, adaptive beliefs (Guskey, 2002; Guskey & Yoon, 2009). Giving teachers the resources and training to improve their craft, and then providing personalized feedback of the effects of their teaching may be a more productive way to generate changes to teachers’ practice *and* their beliefs about competence and the nature of science. We provide examples below.

First, although not in the science teaching literature, the work of Pianta and his colleagues is particularly illuminating because it illustrates a model of teacher change that can be applied across subject areas. These researchers have shown that teachers’ beliefs about the importance of active teacher involvement in young children’s development of language skills can be effectively changed by first changing their practices (Hamre et al., 2012; Pianta, Mashburn, Downer, Hamre, & Justice, 2008). In their model of teacher change, the researchers posited that their professional development intervention would directly influence teachers’ beliefs and knowledge about the importance of early and close teacher interactions with students in developing students’ literacy. However, they also posited that their professional development course would provide teachers with the necessary skills to actually implement best practices involving close teacher-student interactions, and that these learned skills would change teachers’ beliefs as well as their practices. Therefore, in this model, changing teachers’ practices did not have to *first* pass through teachers’ beliefs.

One intriguing aspect of the practice-focused professional development in the study by Pianta et al. (2008) is that teachers would film themselves implementing

an instructional activity, and then send the film to a consultant. The consultant then edited the video to highlight 1 to 2 minute segments that focused on specific behaviors. These edited film segments were accompanied by written feedback from the consultant, which focused on specific aspects of the teachers' practice. Teachers then met online to discuss the feedback and to problem-solve. This strategy of having teachers watch edited segments of themselves may target teachers' self-efficacy and their beliefs about the importance of active involvement through the use of self-modeling and social persuasions (Bandura, 1997). Teachers who can see how specific changes in practice can result in corresponding student outcomes are much more likely to (a) be confident about their teaching capabilities *and* (b) understand the importance of enacting these practices.

Tan and Towndrow (2009) conducted a similar study in which they described the changes that one science teacher underwent as she used digital video recordings of herself to change her use of formative assessments in science. The authors noted that the science teacher was able to meaningfully change her assessment practices and her beliefs about the importance of listening to students only after she had seen the effects of her own actions on video and was able to collaborate with a researcher to design and implement modifications to her practice. What these studies suggest is that teachers in general, and science teachers in particular, have a difficult time seeing their own actions and understanding the effects of those actions on students. By examining these actions and modifying them to better suit the needs of their students, teachers can develop corresponding changes in their beliefs.

This model of teacher change also informs the results of Waters-Adams (2006) mentioned earlier. As Waters-Adams noted, student-teachers need opportunities to enact their practices and observe their effects within a classroom. These experiences, supported through mentors or other colleagues, can then develop student-teachers' self-efficacy to enact rich science inquiry lessons.

Furthermore, if we employ the theoretical meaning systems model outlined in Figure 21.1, we can apply this conception of teacher change to the ways in which teachers teach the complexity of science. For example, Elena, a hypothetical high school chemistry teacher, holds a simplistic view that science really is a compilation of basic truths (i.e., she holds a belief in the "fixed" nature of science). She also feels constrained by the overwhelming focus on standardized tests and the logistical difficulty of providing students with hands-on activities in science (i.e., she has a low self-efficacy for implementing inquiry science practices). If, however, she were able to videotape herself implementing a more constructivist approach to a lesson (in collaboration with others, such as a mentor teacher or a researcher), Elena might witness firsthand that her students were more engaged with the material, and were beginning to develop a more nuanced view of science and how scientific knowledge is created. As Elena continues to change her *practice*, and witness the positive effects of these practices, she is more likely to develop a *belief* in her efficacy for teaching science in a constructivist manner. Just as important, she is also more likely to develop beliefs about science that are more in line with how scientists think about knowledge and knowing.

This idea of changing beliefs by doing is not a new one. Over a century ago, William James (1899/1962), in his book *Talks to Teachers on Psychology: And to Students on Some of Life's Ideals*, declared: "No reception without reaction, no impression

without correlative expression,—this is the great maxim which the teacher ought never to forget. An impression which simply flows in at the pupil's eyes or ears, and in no way modifies his active life, is an impression gone to waste. . . . Its motor consequences are what clinch it" (p. 17). Thus, the chief purpose in science teachers' professional development must be to support teachers through a wide range of successful instructional experiences that involve the use of rich scientific inquiry. By supporting science teachers through the *doing* of teaching inquiry, teachers may come to *believe* more in the efficacy of their abilities to implement successful scientific inquiry lessons for students. But, just as important, by enacting the processes that actual scientists go through, science teachers' views about scientific knowledge and knowing may become more aligned with the views held by the majority of scientific professionals.

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22

TEACHERS' BELIEFS ABOUT SOCIAL STUDIES

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There continues to be vigorous debate over the purpose, goals, and content of social studies since its invention as a school subject in the early 20th century (National Education Association of the United States & Dunn, 1916). The National Council for the Social Studies (NCSS), the preeminent social studies organization in North America, defines social studies as “the integrated study of the social sciences and humanities to promote civic competence” (National Council for the Social Studies, 1994, p. vii). Embedded in this definition is content (social sciences and the humanities) as well as a specific purpose for social studies (citizenship education). Although there has been a great deal of tension over what social studies should encompass (Evans, 2004), the theme of “citizenship education” has dominated as the central purpose of social studies education since it first appeared as a school subject.

Social studies has gradually evolved to become a core curriculum component in Western public education and, as Engle (1994) has argued, the purpose and content of social studies “has remained remarkably unchanged” (p. 8). Although history and citizenship have long had an elevated status within the field (Fallace, 2009; Thornton & Barton, 2010), social studies curricula and research also include geography and/or environmental education (e.g., Guang & Chi Chung, 2009; Saleh, 2010); economics (e.g., Miller & VanFossen, 2008; Yarrow, 2008); peace, moral, and religious education (e.g., Bickmore, 2005; Passe & Willox, 2009); global education (e.g., Mangram & Watson, 2011; Rapoport, 2010), and, more recently, social justice education (e.g., Merrett, 2004; Philpott & Dagenais, 2012; Sonu, Oppenheim, Epstein, & Agarwal, 2012). The combination of which of these are present or absent in social studies curricula and teaching varies depending on where social studies is being taught, to whom, and especially important for our purposes, by who. How social studies is enacted in curricula and taken up in schools varies greatly in large part because teachers hold different beliefs about what social studies is, what it should be, and what purpose(s) it should serve.

Scope and Parameters of the Chapter

Scholars use a variety of terms and methodological approaches to investigate teachers' beliefs about social studies. In addition to studies that named "teachers' beliefs" as their emphasis, research that focused on teachers' decision-making practices, knowledge, perceptions, "personal theories" (Fickel, 2000), rationales, understandings, and attitudes towards teaching social studies were included in this review as scholars have also drawn inferences and conclusions about the beliefs held by teachers about social studies from this research. In this chapter, we provide an overview of the research on teachers' beliefs about social studies, explore implications of this research on the field of social studies education, and suggest directions for future research. Note that, although we employ the terms (such as those as listed above) used by those who conducted the studies, it is our contention that these studies also shed important light on teachers' beliefs about social studies.

The literature included in this review dates from 1991, the year Stephen J. Thornton's (1991) seminal work on the teacher as "curricular-instructional gatekeeper" (p. 237) was published. Thornton brought together, in a systematic way, research on teachers' beliefs about social studies, and he convincingly argued that social studies teachers' beliefs are integral to every other aspect of their teaching, from their understanding of the subject matter, to planning and assessment, to interacting with students. Where possible, Thornton attended briefly to the influence of contextual issues (he used the example of the school ethos) on teachers' "gatekeeping" of social studies, although he noted that sometimes this was not possible "because such information was not included in the reports" (p. 238) reviewed. Scholarly work on sociocultural factors in social studies education research has grown exponentially in the past two decades including in research focused on teachers' beliefs about social studies (e.g., Rubin, 2008; Salinas & Castro, 2010). Therefore, we have attended more systematically to sociocultural issues such as how teachers' beliefs about ethnicity, sexual orientation, and socio-economic status shape their beliefs about social studies teaching and learning. We present some of this research in the section, "Teachers beliefs about themselves and their students."

We include a broad range of international research on teachers' beliefs about social studies, but we acknowledge that ours is not an exhaustive list. We selected literature related to teachers' beliefs about the purpose of social studies education (Al-Nofli, 2010; Brophy & Alleman, 2006; Ross & Marker, 2005) as well as teachers' beliefs about content and pedagogy in social studies (Chin & Barber, 2010; Hootstein, 1999; Stoddard, 2010) generally and about history, geography, citizenship, and teaching controversial issues specifically. Teachers' beliefs about history, geography, and citizenship were given priority over other domains included under the umbrella of social studies education due to their prominence in the field (Evans, 2004). Teachers' beliefs about teaching controversial issues is included as a separate section of this chapter, however it should be noted that controversial issues within social studies cut across its many composite parts. To conclude this chapter, we review literature on teachers' beliefs about themselves and their students within the context of social studies education (Chubbuck, 2004; Collay, 2010; Søreide, 2006).

TEACHERS' BELIEFS ABOUT THE PURPOSE OF SOCIAL STUDIES

The beliefs that teachers hold about the purpose(s) of teaching social studies necessarily influence the pedagogies, practices, and passions they bring to their classrooms, as well as the balance they strike between the multitude of competing disciplines traditionally found in social studies curricula (Thornton, 1991, 2005). In our review we found three overlapping, and nearly universal responses to why teaching social studies is important. These include (a) inculcation in the ways of becoming a “good citizen” (e.g., Milligan, Taylor, & Wood, 2011; Nielsen, 2003; Ritter & Lee, 2009), (b) the transmission and continuation of core, usually national, identities (e.g., Klein, 2010; Orloff, 2011), and (c) an ability to co-exist or even empathize with others (Hawe, Browne, Siteine, & Tuck, 2010; Nieto, 2006; Sonu et al., 2012). The widespread support of these goals does not, however, mean that there is consensus about what each of these goals mean or how they should be achieved.

TEACHERS' BELIEFS ABOUT PEDAGOGY

While pedagogical strategies vary widely in social studies instruction, research on teachers' beliefs has centered on the use of interdisciplinary and inquiry-based approaches (characterized by student-centered instruction where students formulate questions and organize an investigation in order to solve authentic problems; Alberta Learning, 2004), particularly at the elementary level, and the use of an issue-based approach (characterized by students engagement in authentic questions about historical or contemporary issues facing society and can also take an interdisciplinary perspective; Wraga, 1999) at the middle and secondary school levels. Some research has demonstrated the potential for inquiry-based, interdisciplinary teaching to alleviate the pressure on elementary teachers to include all curricular content; however, Bailey, Shaw, and Hollifield (2006) noted that preservice teachers who had learned about these approaches in their social studies methods courses did not see them in evidence during their school-based practice (see also Van Hover & Yeager, 2004). Instead, their mentor teachers cited a lack of time for engaging in such planning/teaching but also “reject(ed) the idea and research on the effectiveness of integrated instruction” (p. 22). We would argue that the mentor teachers' rejection of integrated instructional approaches indicated a *disbelief* in their effectiveness.

An issues-centered approach to teaching social studies at the high school level faces similar obstacles, particularly for teachers who believe it is their job to “cover” as much curricular content as possible within a semester or year. In his study with six middle and high school social studies teachers enrolled in his graduate-level social studies methods course, Caron (2004) noted that an issues-centered approach, which focuses more on depth than breadth, stood in opposition to the teachers' beliefs about covering content. The participants in this study were teachers entering their second year of teaching and had indicated through a reflective writing assignment that they had “struggled with progressive inspired pedagogy” (p. 6). Over an eight-week period, the teachers in Caron's course read and discussed theoretical work about issues-based instruction and developed unit plans focused on this pedagogical approach. Complicating the teachers' desires to adopt an issues-centered approach to teaching social studies was their belief that social studies curricula should be

organized chronologically, not according to issues that may relate to several eras at once. Finally, while some of the teachers in Caron's study identified the benefits of moving to a more student-centered teaching approach (e.g., richer class discussions, increased participation, thoughtful contributions), they also expressed a concern over "giving up" some of their control in the classroom.

With the advent of *No Child Left Behind* (NCLB) in the United States, and with an increased emphasis on literacy, math, and science elsewhere, social studies has struggled for curricular time and space, particularly in the elementary grades (Hutton, Reagan, & Burstein, 2006). Indeed, some elementary school teachers see social studies as "a second class citizen" (Bailey et al., 2006, p. 22). The news is not completely grim, however. There are some researchers who demonstrated that teacher education programs do influence student teachers' pedagogical beliefs and practices in social studies; particularly when combined with powerful school-based experiences and a cooperating teacher willing to support their efforts to implement ideas learned during their coursework (Adler, 2008; Doppen, 2007; Van Hover & Yeager, 2004).

TEACHERS' BELIEFS ABOUT SOCIAL STUDIES CONTENT

As noted above, the main curricular emphasis in social studies has been, and for the most part continues to be, history, geography, and citizenship education. In the following sections, we review research on teachers' beliefs in these three areas.

History

Research in history education has found that teachers' beliefs about the discipline of history influences not only how they teach it (Mayer, 2006), but also determines how they fit new epistemological or historiographical insights into their practice (Grossman & Stodolsky, 1994; Sawyer & Laguardia, 2010; VanSledright, Kelly, & Meuwissen, 2006). Epistemology is concerned with "the theory of knowledge, especially with regard to its methods and validation" (Barber, 1998, p. 470). In terms of history education, Halldén (1986) asserted that epistemology is concerned with "conceptions of the subject of history itself, of what is the object of study in history, and what constitutes an explanation in history" (p. 53). One's epistemology about history greatly influences how one understands history, how one works with and interprets evidence, and how one approaches the teaching of history (e.g., Maggioni, VanSledright, & Alexander, 2009; Marcus, Levine, & Grenier, 2012).

In a mixed methods study that documented 45 secondary history teachers "ideas about knowing history and learning history" (p. 4) across three Teaching American History (TAH)-funded professional development programs, VanSledright, Maggioni, and Reddy (2011) identified three "epistemic stances" (p. 10) towards history, which they contend are informed by the teachers' beliefs about the discipline. These stances included the *copier* (the past happened and history chronicles it), the *subjectivist* (history is whatever the knower decide it is—all opinions are valid or right), and the *criticalist* (the knower weighs and corroborates evidence, and exercises judgment about how she has come to know about the past).

Teachers' epistemic beliefs about history can be resistant to change without sustained professional development (de la Paz, Malkus, Monte-Sano, & Montanaro, 2011; Peck, in press). For example, in a study that followed up with teachers after they had participated in a professional development program, Sawyer and Laguardia (2010) found that 7 of the 21 participants "continued to exhibit a relatively generic and instrumental view of teaching for historical thinking" (p. 2016) despite having participated in professional development that challenged these views.

The influence of epistemological beliefs is also present in preservice preparation (e.g., Fantozzi, 2012; Seixas, 1998). Fallace (2007) found that the preservice teachers enrolled in a course designed to bridge the gap between the work of historians and the students' teaching of history held a range of epistemological stances on history which included compartmentalized thinking about what history is and how it should be taught (see also Fallace & Neem, 2005). At the beginning of the course, which focused on embedding inquiry-based learning into history lessons, student teachers had a great deal of difficulty understanding how inquiry could be used to teach history. By the end of the course, Fallace found that students' compartmentalized thinking had diminished (although not completely) and recommended that student teachers have more exposure to courses exploring historiography and pedagogy as part of their preservice education.

Finally, teacher's epistemic beliefs about resources and materials further inform the pedagogical approaches they use in the history classroom. Where media as an historical source is concerned, for example, Stoddard (2009, 2010) found that teachers were limited by their prior epistemic belief that media is a "value neutral" resource to encourage historical thinking, particularly when the media in question aligned with the teacher's own moral or ethical position.

Citizenship

Citizenship education has been cited as the central purpose of social studies since it was first created as a school subject (Duffield, Wageman, & Hodge, 2013). In addition to learning about the role of government and laws in society, social studies aims to help students develop civic values and attitudes. In a general sense, teachers believe that learning about and developing citizenship competencies are important and worthwhile goals of social studies education (Chin & Barber, 2010).

Drawing the work of Parker (1996, 1999) as well as other theorists, Westheimer and Kahne (2004) advanced three distinct conceptions of "good citizenship" after examining 10 U.S. educational programs focused on promoting democratic ideals and engagement. These include the personally responsible citizen (e.g., votes, obeys the law), the participatory citizen (participates in social institutions, for example, volunteers at a homeless shelter), and the justice-oriented citizen (looks at society through a critical lens, for example, investigates why people are homeless and works to make change). They argued convincingly that teachers' choices regarding what constitutes a good citizen are not arbitrary or left to chance but are "political choices that have political consequences" (p. 237), even when teachers are not explicitly aware of the choices they make or the beliefs they hold.

Drawing on the theoretical framework of Westheimer and Kahne (2004), Patter-son, Doppin, and Misco (2012) surveyed and interviewed U.S. high school teachers'

on their beliefs about citizenship. Based on the questionnaire responses ($n = 155$), Patterson et al. categorized the majority of the teachers in their study ($n = 102$) as having a “personally responsible” conception of citizenship. Far fewer teachers ($n = 39$) were categorized as having a “participatory” conception of citizenship, fewer still ($n = 6$) held the “social justice” orientation, and 8 teachers held “undetermined” beliefs. In interviews with a subset of teachers ($n = 9$), again the researchers found that majority of teachers held beliefs that fell in the “personally responsible” camp. Patterson et al. offer an important caution for researchers investigating teachers’ beliefs about citizenship: “Although social studies teachers in this study ranked ‘preparing good citizens’ as the most important reason for teaching social studies, the way in which they made meaning of the high-inference construct of citizenship constitutes a slippery path. In short, *prima facie* responses can often be misleading as beliefs and actions are not always congruent” (p. 203).

Indeed, Tupper (2007), working with five social studies teachers in western Canada, demonstrated the tensions inherent in teachers’ beliefs about citizenship education, particularly in the context of a high stakes, standardized testing regime. The teachers in her study constructed citizenship “in myriad ways that privileged delivery of particular knowledge (and particular identities) at the expense of other potentially more meaningful conversations” (p. 266), despite their desire to make citizenship about building connections with others, about developing better and new understandings of the world, or about exploring the “fluid, adaptable and dynamic” nature of citizenship (p. 270).

In a study with seven American and six Canadian high school history teachers, Faden (2012) found that teachers held beliefs about citizenship education very similar to the model described by Westheimer and Kahne (2004), explained briefly above. Faden found that 11 of the 12 teachers’ citizenship orientations (or beliefs) fell into Westheimer and Kahne’s notion of the personally responsible or the participatory citizen, effectively limiting any chance to engage more critically with historical topics as a social justice-oriented approach might allow. For instance, the Canadian teachers sought to promote an understanding of Canada as a multicultural and socially just nation—a widely propagated myth about what it means to “be Canadian” (Kymlicka, 2003). Their adherence to this belief about Canadian history and society combined with their less than critical citizenship orientation got in the way of their ability to critically engage students with societal issues. The American teachers “wanted to promote an independent, engaged and participatory model of citizenship, but at the same time, they expressed discomfort with discussing political matters” (Faden, 2012, pp. 185–186) which would lead to such engagement.

Geography

Research on teachers’ beliefs about geography education is very limited in scope (Segall & Helfenbein, 2008). In one study with 105 prospective secondary school geography teachers, Walford (1996) identified four conceptions of geographic education (see Table 22.1) that influenced the prospective teachers’ beliefs about the purpose of teaching geography. Inspired by Walford’s work, Catling (2004) sought to understand English preservice primary school teachers’ beliefs about geography

Table 22.1 Comparison of Secondary and Elementary Preservice Teachers' Beliefs About Geography (Catling, 2004; Walford, 1996)

Preservice Teachers' Beliefs about Geography	
Walford (1996) Secondary preservice teachers	Catling (2004) Elementary preservice teachers
<i>Interactionists</i> : Emphasize interdependence and interaction of humans and the environment	<i>Interactionists</i> : Emphasize interdependence and interaction of humans and the environment
<i>Placeists</i> : The importance of understanding how places are developed, what they are like, and why	<i>Placeists</i> : Similar to Walford's category; understanding place and "developing a sense of place" (p. 152); especially understanding people's lives in the context of culture and community
<i>Synthesizers</i> : Focus on developing global responsibility for the environment by examining issues from multiple disciplinary perspectives	<i>Environmentalists</i> : Focus on the impact of human activity on the environment; concerned with sustainability
<i>Spatialists</i> : Cultivate spatial awareness through an analysis of human interactions with the physical environment	<i>Earthists</i> : "Concerned with knowledge and understanding about how the world works" (p. 152).
	<i>Globalists</i> : Focus on the characteristics of the earth (e.g., features, countries, types of environments)

education. Whereas Walford identified four distinct conceptions of geography among prospective teachers who were specializing in geography education, Catling's work with non-specialist teachers identified five ideas about geography amongst the participants, with only two of these aligning closely with Walford's categories (see Table 22.1; areas of overlap in bold). Studies that compared specialists' and non-specialists' beliefs about geographic education would be helpful, in order to better understand why such differences exist.

One study that departs from those reviewed thus far was that conducted by Guang and Chi Chung (2009) on Chinese teachers' beliefs about education for sustainable development (ESD). They found that teachers believed it was important to teach ESD to their students. The majority of teachers explained ESD in terms of "equality, sustainability and united action" (p. 24) although they differed in terms of their environmental values. Whereas some teachers thought economic development should supersede all other priorities when it comes to the environment, other teachers took a more moderate stance and believed that "economic development ought to go 'hand in hand' with environmental conservation" (p. 25). As societies across the world become more aware of the environmental cost of development, more studies focused on teachers' beliefs about ESD seems likely, or at least warranted.

TEACHERS' BELIEFS ABOUT CONTROVERSIAL ISSUES

Whether or not teachers choose to teach them, controversial issues are an important part of social studies curricula and cut across the different subject areas encompassed by the social studies. Research on teachers' beliefs about teaching

controversial issues has focused on the reasons why teachers included controversial issues in their teaching, on the criteria they used to select issues, and on the teachers' beliefs about their role in teaching controversial issues (Hess, 2008). For many teachers, teaching controversial issues "aligns with their conceptions of democracy and the purpose of schooling" (Hess, 2008, p. 128). However, some teachers avoid teaching controversial issues for fear of creating controversy in the school and/or community, and others do so because they believe that such issues might negatively impact some students in their class, particularly if the issue at hand is "too hot to handle" (Hess, 2008, p. 128).

What constitutes a controversial issue is open for debate. Hess (2002, 2005, 2008) found that teachers disagreed on whether an issue is, in fact, controversial and further theorized that teachers' political views influenced their understanding of what constitutes a controversial issue in four different ways. First, some see an issue as non-controversial because they believe a "right answer" exists. Such issues are closed to interpretation. Second, an issue is recognized as controversial and may be interpreted a number of ways but there is still only one correct answer. In both of these cases teachers believe it is their job to help students arrive at certain predetermined conclusions decided upon by the teacher (see also Camicia, 2008; Cornbleth, 2008). Third, teachers believe they should avoid controversial issues altogether because their personal opinions are too strong and will inappropriately influence students' thinking. Fourth, teachers believe that issues are much murkier and difficult to resolve and thus open to interpretation. The purpose of teaching controversial issues for teachers with this fourth stance is to teach students to investigate and understand different perspectives on an issue, and ultimately, to come to a determination about their own position on the issue.

Deciding whether to share one's opinion about an issue is a perennial debate in the research on teaching controversial issues. Miller-Lane, Denton, and May (2006) found that the majority of rural social studies teachers in their study believed they should not disclose their opinions to students. The teachers stated that they would rather take an impartial position and facilitate discussion amongst students, in large part because they feared a negative community reaction, which they felt would prevent them from teaching controversial issues in the future. Maintaining a neutral stance is not as easy as it might seem. As Washington and Humphries's (2011) research participant noted, "neutrality sound[s] good in the abstract but [is] difficult to accomplish" (p. 101). Barton and McCully (2007) argued that teachers who profess the benefits of taking a neutral stance on controversial issues give too much weight to the influence their opinions have on students. They noted that "students can generally infer their teachers' positions through body language" and that "students consider themselves to be capable of developing positions on controversial issues without being influenced by their teachers" (p. 15).

Research on teachers' beliefs about controversial issues has focused on teachers working at the middle or senior high levels. Controversial issues exist in the elementary grades as well (e.g., diverse family compositions, stereotypes, etc.), and more research is needed in elementary contexts to better understand teachers' beliefs about engaging students in controversial issues in the younger grades.

SOCIAL STUDIES TEACHERS' BELIEFS ABOUT THEMSELVES AND THEIR STUDENTS

As we mentioned in the introduction to this chapter, sociocultural studies in social studies education has extended into research on teachers' beliefs about themselves and their students.

Social Studies Teachers' Beliefs About Themselves

The ways in which teachers “know what they know” about their own ethnic locations, as well as their other sociopolitical identities, necessarily influence their own understandings of subject matter and how they teach it (Faden, 2012; Halagao, 2004; Søreide, 2006). Teacher's ethnic and other positionalities influence their choosing to enter the teaching profession, and their understandings of themselves as professionals. In his profile of contemporary social studies teachers in the United States, Fitchett (2010) found that social studies continues to be a white, male-dominated field, that social studies teachers tend to self-segregate by race within their school environments, and that the least qualified educators were the most likely to work with “at-risk” populations. There is also some evidence to suggest that the typical social studies teacher described by Fitchett is at least partially drawn to employment as a social studies teacher because of beliefs about the opportunities or requirements for coaching a sports team (Chiodo, Martin, & Rowan, 2002; Connors, Melinds, Weller, & Smith, 2000). Many European-descent beginning teachers responded that wanting to replicate their own positive experiences in schooling contributed to their “calling” or “dream ambition” of becoming a teacher (Watt & Richardson, 2008).

Research with Latino/a teachers offers a counter narrative whereby choosing to teach is an act of returning to home communities as a means of resisting, reclaiming, and redressing individual and systemic exclusion from formal schooling (Irizarry & Donaldson, 2012; Urrieta, 2004). Teachers of variously marginalized ethnicities working in underserved urban schools further articulate leadership and social justice activism as central to their professional identities (Collay, 2010).

Social Studies Teachers' Beliefs About Students

Teachers' beliefs about the multiple sociopolitical locations of their students, including beliefs about youth and youthfulness itself, inform professional decisions about both the pedagogies and content used in teaching social studies. In a review article of their own research, Massengill-Shaw, Barry, and Mahlios (2010) noted that, when asked to select metaphors that describe their beliefs about life, childhood, and teaching, the elementary and secondary preservice teachers (including those majoring in social studies) understood childhood as an idealized notion of innocence, freedom, and choice.

Beliefs about who children are necessarily influences the topics social studies teachers choose to teach. For example, James (2008) found that elementary teachers resisted teaching difficult historical knowledge largely because they had cast themselves as “protectors” of young children who they considered as developmentally and morally unprepared for troubling content.

Secondary teachers also see themselves as guardians and “gatekeepers” (Thornton, 1991, 2005) shielding their students from difficult topics. For example, due to their belief that their students did not critically engage with media and popular culture, Mangram (2008) found that the 15 secondary teachers in his study avoided media literacy in the social studies classroom because “they believed they had ‘to protect’ their students from the harmful effects” (p. 53) of contemporary images and texts.

As has been noted extensively elsewhere, having a privileged socioeconomic status (SES) is a strong predictor of a student’s success in formal education (Anyon, 1997; Sirin, 2005). Research on teachers’ beliefs in social studies includes findings on teacher’ expectations for and beliefs about students based on their SES. Teacher perceptions of SES have been found to influence the pedagogies used in the social studies classroom. For example, teachers’ use of high-order questions (Dull & Murrow, 2008) and discussion-centered approaches to social and cultural issues in their social studies classes are rare occurrences in either elementary or secondary social studies classes (Hemmings, 2000; Hutton et al., 2006; Rubin, 2008) and, when they do occur, they are much more prevalent in high SES schools than they are in more economically marginalized classrooms. Teachers who teach large class sizes and report working with “disruptive students” likewise avoid these pedagogical approaches because they believe they could result in the teacher losing control of the classroom (Hootstein, 1999). This research raises more questions than it answers as much of it only tangentially mentions teachers’ beliefs in its conclusions; more explicit attention to beliefs in studies on social studies teachers’ classroom practices is necessary.

Teachers have been found to simultaneously hold contradictory views of students whose racial or religious identity differs from their own. Consistent with discourses of color-blindness, the following is typical of ethnically privileged, white teachers’ responses to questions about ethnic and religious diversity: “I think all students need understanding. So really I transcend, or at least I try to in my teaching, those differences per se. So, I’m not really aware of the Arab students as a community” (Thea Renda Abu, 2010). Yet in subsequent interviews about the Arab students in their school, “teachers frequently drew on dominant images of Arab and Muslim women’s oppression, stating, for example, that they ‘are subservient,’ ‘are viewed as male property,’ ‘walk three steps behind their husbands,’ and ‘have no freedom’” (p. 251). Such cognitive dissonance could be indicative of how, despite admonitions to the contrary, pernicious beliefs about marginalized ethnic minorities are deeply rooted and perhaps difficult to change (Chubbuck, 2004; Mathews & Dilworth, 2008). The burden of disrupting the racialized stereotypes of their colleagues is disproportionately taken up by teachers who are ethnic minorities, and who, unsurprisingly, report resenting taking up such extracurricular education (Mabokela & Madsen, 2007; Salinas & Castro, 2010).

Over the past decade, increasing attention has been paid to how teachers perceive sexual and gender minority students. Although a clear majority of educators report feeling comfortable with lesbian, gay, bisexual, transgendered, and queer (LGBTQ) youth, and indicate a willingness to learn more about the specific needs of these students (O’Connell, Atlas, Saunders, & Philbrick, 2010), students and teachers alike report hearing homophobic remarks from classroom teachers with considerable frequency, sometimes as often as daily or weekly (Alexander, Santo, Da Cunha, Weber, & Russell, 2011; Crocco, 2002; Pizniony-Levy, Kama, Shilo, & Lavee, 2008).

These findings correlate with the pervasive heterosexism, homophobia, and gender normativity that, through their invisibility, remain unchallenged by teachers in social studies education (Oesterreich, 2002; Richardson, 2008; Ruitenberg, 2010; Schmidt, 2010). Social studies teachers are also largely silent on LGBTQ history, such as the Stonewall riots or persecution in the Holocaust, or citizenship claims, such as marriage equality or the gay rights movement (Crocco, 2002; Schmidt, 2010). As a possible redress, Mayo (2013) recommends that social studies teachers develop formal relationships with their school-based Gay Straight Alliances, where LGBTQ history and citizenship are discussed regularly.

FUTURE DIRECTIONS

There are numerous terms that can be subsumed under “beliefs.” In this regard, research on teachers’ beliefs about social studies has not made much progress since Thornton’s (1991) review. Some consistency in the use of terms, or at the very least a clear explanation of the constructs that are the focus of research, would enable researchers to develop a broader understanding of the breadth and depth of research on teachers’ beliefs about social studies.

Research on teachers’ beliefs about history and citizenship is quite well developed, whereas research on teachers’ beliefs about geography and economics, also part of the core of social studies curricula, is woefully inadequate. In addition, there is a smattering of research on teachers’ beliefs in areas that are closely aligned to social studies education such as peace education, human rights education, environmental education, global education, and social justice education, to name a few. As these curricular foci garner more attention amongst students, educators, and educational policy makers in our increasingly interconnected and complex world, more research on how teachers’ beliefs influence their teaching of these concepts is greatly needed.

Most of the studies that we reviewed focused on middle or high school level teachers’ beliefs about social studies. Teachers in middle and high schools tend to have more subject area specializations than do elementary school teachers, who are more likely to have a generalist background. Ever since the “cognitive revolution” educational theorists have emphasized the importance of prior knowledge on new learning (Gardner, 2006), so it seems especially important to better understand elementary teachers’ beliefs about social studies (and its composite parts) as they are responsible for laying the groundwork for future learning in the older grades.

Further, studies that look to explain the relationship between teachers’ beliefs about social studies and their practice would be a welcome contribution to the field. We reviewed many studies that investigated teachers’ beliefs about various aspects of social studies, much of which relied exclusively on teacher self-reports about their beliefs. We know less about what happens to those beliefs when the teacher is actually teaching social studies. A small sample of studies combined various methodological strategies including questionnaires, classroom observations, and teacher interviews to draw a more complete picture about teachers’ beliefs about social studies, but more are needed. We recognize that a barrier to more complex studies is the time (and possibly financial) commitment required of both the research and participants; however, our review would indicate that these are the very studies that are needed.

From teaching about families in grade one, to the Civil Rights Movement in middle school, to globalization in secondary school, social studies encompasses wide-ranging topics that are at once intensely personal and also of critical importance to public life. Understanding teachers' beliefs about social studies is crucial for understanding both how it is taught and how the beliefs of the teacher shape the way the concepts, values, and goals of the subject matter are interpreted and communicated to students.

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23

TEACHERS' BELIEFS AND USES OF TECHNOLOGY TO SUPPORT 21ST-CENTURY TEACHING AND LEARNING

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Previous research has established the importance of teachers' beliefs to classroom practices including teachers' choices of instructional strategies (Smith & Southerland, 2007; Wilkins, 2008) and assessment methods (National Association of State Boards of Education, 2009), as well as their selection of instructional resources (Speer, 2008) and technology tools (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012). As noted by Fives and Buehl (2012), research on teachers' beliefs spans nearly 60 years and includes over 700 empirical studies. Yet, despite this large body of work, additional research is needed to explicate the relationship between teachers' pedagogical beliefs and their uses of digital technologies, specifically those that support 21st-century teaching and learning.

Focus on Pedagogical Beliefs

A number of internal factors have been demonstrated to influence teachers' uses of technology including self-efficacy (Inan & Lowther, 2010), knowledge (Koehler & Mishra, 2009), attitudes (Holden & Rada, 2011), and pedagogical beliefs (i.e., beliefs about teaching and learning; Ertmer, 2005). Although we acknowledge that these are all important to understanding how to effect changes in teachers' uses of technology, we focus this chapter on the role of pedagogical beliefs, as they are one of the strongest predictors of teachers' technology uses (Inan & Lowther, 2010; Miranda & Russell, 2012). (Self-efficacy beliefs, which are also important, are addressed in Siwatu and Chestnut, Chapter 12, this volume.) Building on Rokeach's (1972) definition, we

define pedagogical beliefs as any proposition, specifically related to teaching and learning, which begins with the phrase, “I believe that . . .”

Within the field of educational technology, teacher practices have typically been classified as traditional or constructivist. For example, based on survey responses of over 4,000 teachers, Ravitz, Becker, and Wong (2000) concluded, “behind all teaching practices and beliefs about teaching are two overarching approaches to teaching . . . traditional transmission instruction and constructivist-compatible instruction” (p. 3). Whereas a traditional approach emphasizes teacher explanations and students’ repetitive practice, a constructivist approach emphasizes experiences with authentic problems. In general, studies have confirmed that teachers with more constructivist beliefs tend to use technology more frequently (Hermans, Tondeur, van Braak, & Valcke, 2008) and in more challenging ways (Chai, 2010; Ertmer et al., 2012).

Over the last 30 years, there has been a persistent call, not only for teachers’ increased use of digital technologies, but for more constructivist uses (U.S. DOE, 2010; UNESCO, 2011). The literature suggests that if we are going to change teachers’ technology practices, we also need to change the underlying beliefs that support and facilitate that practice (Chai, Hong, & Teo, 2009; Sang, Valcke, van Braak, & Tondeur, 2010).

Focus on Digital Technologies

Although some define technology in broad terms, our focus is specifically on *digital* technologies. Unlike traditional tools, digital technologies are not readily assimilated into teachers’ current practices and thus, often require teachers to adopt new pedagogies (Ertmer, 2005). Given both the significant potential to change the nature of instruction, as well as the difficulties inherent in adopting new tools and pedagogies, digital technologies provide a critical context for the investigation of the relationship between teachers’ beliefs and classroom practice.

Focus on Technology to Support 21st-century Teaching and Learning

Recognizing that teachers use technology for a variety of tasks and in a variety of different ways (U.S. DOE, 2010), we draw special attention in this chapter to teachers’ uses of technology to support *21st-century* teaching and learning. The 21st-century skills refer to students’ capacity to “apply knowledge and skills in key subject areas and to analyze, reason, and communicate effectively as they raise, solve, and interpret problems in a variety of situations” (Ananiadou & Claro, 2009, p. 7). Based on their analysis of eight frameworks describing 21st-century competencies, Voogt and Pareja Roblin (2012) noted that, in general, these competencies can be characterized as (1) *transversal*—relevant across many fields and disciplines, (2) *multidimensional*—including knowledge, skills, and attitudes, and (3) *associated with higher-order skills and behaviors* that enable students to cope with complex problems.

According to Voogt and Pareja Roblin (2012), information and communication technology (ICT) is at the core of these 21st-century frameworks. Additionally, these frameworks promote the idea that ICT skills should be developed alongside other 21st-century competencies such as critical thinking, problem solving, communication, and collaboration.

It is important to note that although these 21st-century *frameworks* are relatively new, the call for integrative approaches is not; early calls for constructivist teaching methods (Becker, 1994; Cuban, 1993) or reform-based teaching (Haney, Lumpe, Czerniak, & Egan, 2002; Hannafin & Savenye, 1993) advocated these same goals. Previous work has described similar types of integrated technology uses as “high-level” (Ertmer, 1999), “meaningful” (Means & Olson, 1997), “student-centered” (President’s Panel on Educational Technology, 1997) or “constructivist” (Becker & Riel, 1999). In general, we treat these terms synonymously and use them interchangeably.

Using technology to support 21st-century teaching and learning is advocated by best practice (Lawless & Pellegrino, 2007; National Research Council [NRC], 2012). While no one is likely to disagree that technology enables us to do things easier and faster, current education standards (e.g., NRC, 2012) suggest that technology should be used as part of a meaningful and impactful approach to instruction, altering both the content and context of learning, instruction, and assessment.

The need to develop students’ 21st-century skills is emphasized by a large number and variety of stakeholders (Partnership for 21st Century Learning, 2011; U.S. DOE, 2010; UNESCO, 2011). In a recent OECD (Organization for Economic Cooperation and Development) report, Ananiadou and Claro (2009) noted that people from nearly all sectors of the reporting population (e.g., teachers, educational researchers, policy makers, politicians, employers) agreed that the competencies required to function effectively in today’s society are different than those required in the 20th century. Efforts to address 21st-century skills in today’s classrooms are evident across the U.S. as well as a large number of European Union and OECD countries such as Australia, Japan, Korea, and Turkey (Voogt & Pareja Roblin, 2012). In fact, the impetus for this focus on 21st-century skills began over 30 years ago.

HISTORICAL CONTEXT

When computers were first introduced into K-12 classrooms, it was expected that teachers would readily integrate them as long as access, training, and support were available (Dwyer, Ringstaff, & Sandholtz, 1990). However, studies indicated that despite increases in these external supports, teachers’ classroom uses lagged behind (e.g., Hadley & Sheingold, 1993). That is, the majority of teachers’ uses simply replaced current classroom methods or served as optional supplements to traditional classroom instruction (Loveless & Dore, 2002). As noted by Cuban (1997), the general “pattern of computer use [was] one of limited and unimaginative instructional use” (online, ¶3).

Given observed differences in the ways teachers were initially using computers, a number of large-scale survey studies were conducted to identify factors that impacted teachers’ uses (Becker, 1994; Sheingold & Hadley, 1990). Based on his results, Becker concluded that the teaching environments of exemplary computer users typically included four key components: school support, the presence of other computer-using teachers in the building, resources for staff development, and smaller class sizes. However, these factors did not completely account for the noted differences between exemplary and typical users. In addition to observed differences in teachers’ backgrounds and their previous experiences with computers, Becker hypothesized

that differences between exemplary and typical users related to differences in teachers' perceptions concerning teaching and the relative value of computer use.

Thus, attention turned to the critical role teachers played in the integration process (Cuban, 1993; Hannafin & Savenye, 1993). In addition to early training efforts directed toward reducing teachers' fears and increasing their knowledge, skills, and confidence (Ertmer, Evenbeck, Cennamo, & Lehman, 1994), discussion of other important factors, using a variety of labels (e.g., teaching styles, personal theories of learning, tolerance for risk, perceived value of technology), also occurred. Many of these factors were described using the label "teacher beliefs," although definitions were rarely given and distinctions among these many concepts were muddy, at best (Kagan, 1992; Pajares, 1992). Notably, however, the conversation began to include the idea that teachers' classroom technology uses were related, in significant ways, to their beliefs about effective teaching and learning (Dwyer et al., 1990; Honey & Moeller, 1990).

Since that time, thousands of articles have been written about "teacher beliefs and technology." A quick search of Google Scholar showed that between the years 1990 and 2012, there were over 7,000 articles that included the terms "teacher beliefs" and "technology," with nearly 65% of these appearing in the last six years (2006–2012). Of course, numbers alone cannot tell the whole story, nor ensure we know everything we need to know about this relationship. In the next section, we discuss research findings that inform our understanding of the relationship between teachers' beliefs and technology use, including barriers that impact its enactment.

EXPLICATING THE BELIEFS-PRACTICE RELATIONSHIP

Initially, educators considered the relationship between beliefs and practice to be more-or-less one directional and hypothesized that by simply adding technology into classrooms, changes in practice—and subsequently, changes in beliefs—would occur. For example, ACOT (Apple Classrooms of Tomorrow) researchers infused classrooms with technology with the expectation that changes in teachers' practices would follow (Dwyer et al., 1990). And although change did not occur as quickly as expected, researchers reported a gradual "evolution" in practice, which appeared to follow a predictable progression over time.

Given this view, there was a general optimism among educators and policy makers that technology could serve as a catalyst for educational reform (e.g., Collins, 1991; Newman, 1992). That is, given enough time, teachers could be expected to use technology in innovative and powerful ways. However, this view failed to take into account the numerous teacher (e.g., knowledge, teaching style, beliefs) and contextual (e.g., school culture, organizational structures, support) variables known to impact the change process (Tondeur, Devos, Van Houtte, Van Braak, & Valcke, 2009). In the next section, we discuss the links between teachers' beliefs and technology integration practices, including how meaningful integration is hindered or facilitated by various barriers and enablers.

Linking Teachers' Beliefs With Technology Integration Processes

According to Lawless and Pellegrino (2007), *technology integration* is "the incorporation of technology resources and technology-based practices into the daily routines, work, and management of schools" (p. 577). However, there are many ways in which

integration can occur, not all of which are productive or meaningful. For integration to be “meaningful” in today’s classrooms, there is the general expectation that the use of technology will be directed toward students’ attainment of 21st-century goals (Ertmer et al., 2012; Johnson & Saylor, 2013). This is not to suggest that other uses have no place in the classroom, only that our primary efforts should be directed toward uses that build students’ capacity to learn and work in the 21st century.

Of course, teachers’ ability to achieve technology integration is influenced by both external (e.g., infrastructure, training) and internal (e.g., confidence, beliefs; Hew & Brush, 2007) factors. Ertmer (1999) categorized these factors as first- or second-order barriers, or enablers, to change. In terms of technology integration, first-order barriers comprise external barriers and include lack of access to computers and software, insufficient time to plan instruction, and inadequate technical and administrative support. Second-order barriers are those that are internal to the teacher and include beliefs about teaching, attitudes toward computers, comfort with established classroom practices, and openness to change.

Initially, efforts to support technology integration focused on eliminating basic first-order barriers (Dwyer et al., 1990) with school districts investing substantial funds to increase teachers’ access to resources and training (National Education Association [NEA], 2008). Consequently, these barriers have been substantially reduced. For example, in the U.S., nearly 100% of schools now report having access to Internet-connected computers, with the average student-to-computer ratio around 1.7 to 1 (Gray, Thomas, & Lewis, 2010).

As summarized in a recent report by the Pew Internet Research Center (2013), 97% of surveyed teachers now have access to a laptop or desktop computer at school. Furthermore, 54% of respondents described themselves as “very confident” using new digital technologies. Although we recognize these statistics are not representative of all countries, and particularly not of developing countries, we refer readers to Plomp, Anderson, Law, and Quale (2009) for a more global perspective.

Despite the progress noted above, the majority of teachers have yet to achieve the types of uses that support meaningful student outcomes (National Association of State Boards of Education, 2012). Simply put, although first-order barriers have been greatly reduced, second-order barriers still prevent teachers from using technology to facilitate 21st-century learning. This may be because, as Fullan and Stiegelbauer (1991) explained over 20 years ago, confronting second-order barriers typically requires redefining teachers’ basic ideas about classroom practice, including what it means “to teach.” To fully understand teachers’ technology integration practices we must understand not only what resources they possess, but also how and why they decide to use those resources (Speer, 2008).

Still, it is important to remember that these factors (e.g., school culture, technology access, beliefs) can also serve as enablers (Ertmer, Ottenbreit-Leftwich, & York, 2006–2007; Vanderlinde, van Braak, & Tondeur, 2010). For example, in cases where technology resources are plentiful, or in which the school culture has already redefined teachers’ and students’ roles, student-centered beliefs can enable teachers to take immediate advantage of these resources with little, if any, additional prompting (Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010).

Furthermore, it is quite possible for teachers to incorporate technology into their classrooms without making significant changes in their teaching practices or changing their beliefs about the teaching and learning process. For example, when

technology is used to supplement existing practices or to make current practices more efficient, technology use is more readily assimilated into teachers' established classroom routines. However, when technology is used to achieve 21st-century goals (e.g., collaboration, critical thinking, problem solving), change is typically required along multiple dimensions of practice as teachers must not only assimilate the technology, but also accommodate the new goals, structures, and roles initiated by the integration process (Ertmer et al., 2012).

Linking Teachers' Beliefs With Types of Technology Uses

As noted by Hermans et al. (2008), in order to fully understand *how* and *why* teachers use computers, we must first understand their beliefs about teaching and learning. In this section, we focus on the *different ways* teachers use technology. As documented by numerous researchers (e.g., Tondeur, van Braak, & Valcke, 2007; Ertmer et al., 2012), teachers with different *types* of beliefs (i.e., constructivist vs. traditional) tend to use technology in different ways. And while this explanation may oversimplify the complexity of both teachers' practices and their beliefs, a substantial amount of research has examined the belief-practice relationship using this simple framework. We summarize the results of this work first, and then, in the next section, discuss some of the difficulties associated with using this dichotomous approach to describing both beliefs and practices.

Early research efforts (Becker, 1994; Hadley & Sheingold, 1993) documented how teachers with different beliefs used technology in different ways. For example, Honey and Moeller (1990) conducted semi-structured interviews with 20 K-12 teachers to determine how they conceptualized the relationship between education and technology and how they used technology in their classrooms. The authors concluded that teachers' educational beliefs played an important role in *how* they appropriated technology in their classrooms. Examining this in more detail, using survey data collected from 4,000 U.S. teachers, Becker (2000) concluded that teachers with constructivist beliefs used computers more frequently, and in more challenging ways than teachers with more traditional beliefs. More specifically, Becker described how teachers with constructivist beliefs created environments in which their students deepened their understandings by exploring how and when their knowledge applied to new situations.

Since these early reports, a number of researchers have examined this particular dimension of the beliefs-practice relationship with the general consensus being that teachers with more traditional beliefs tend to implement more teacher-centered or "low level" uses of technology, whereas teachers with more constructivist beliefs tend to implement more student-centered or "high level" uses (Hermans et al., 2008; Judson, 2006; Roehrig, Kruse, & Kern, 2007). Researchers have explained this relationship by hypothesizing that teachers use technology in ways that "fit" within their existing belief systems (Palak & Walls, 2009). That is, if teachers perceive that technology addresses important instructional and learning needs, the perceived value will be higher and subsequent use more likely (Chang, Lieu, Liang, Liu, & Wong, 2012). Conversely, if a teacher fails to sense alignment between the technology's purpose and specific classroom goals, she's likely either to not use the technology at all or to use it in ways that support the traditional activities with which she is more comfortable (Levin & Wadmany, 2006).

Researchers have described how these different values and beliefs play out in teachers' uses of technology (Ottenbreit-Leftwich et al., 2010; Tondeur et al., 2007). For example, in traditional classrooms, technology typically plays a supporting or supplemental role (Ertmer et al., 2012). More specifically, teachers with traditional beliefs may use technology to present a lecture, search the Web for information, or ask students to complete drill-and-practice exercises to reinforce skills or concepts taught in previous lessons (Ertmer, 2005; Mama & Hennessy, 2013).

In contrast, in constructivist classrooms, technology plays a more integrated role, serving as a cognitive tool to facilitate authentic student learning (Ertmer & Ottenbreit-Leftwich, 2013). In these classrooms, it is the students, not the teacher, who use the technology, specifically to support their efforts as researchers, designers, and problem solvers (Ertmer et al., 2012). For example, one teacher in the Ertmer et al. study described how her first-grade students kept individual blogs on which they posted their thoughts and feelings about various classroom activities (e.g., "my adding strategy"). The teacher encouraged parents, peers, and outsiders to comment on her students' blog posts. In this instance, young students used the technology (blogs) to support their own reflective learning.

These types of uses, typically enacted in the classrooms of teachers with constructivist beliefs, are similar, if not identical to, those currently advocated by 21st-century frameworks (Voogt & Pareja Roblin, 2012). Based on the results from 21 countries participating in the 2006 SITES (Second Information in Technology Education Study) survey, Plomp et al. (2009) concluded that differences observed in how teachers used technology in their classrooms was related to their pedagogical orientations as well their understandings of the skills required for a 21st-century education. Furthermore, they argued that although the 21st-century skill movement continues to grow, few school leaders are familiar with this activity. These findings highlight the need for a supportive school culture (Tondeur et al., 2009), as well as professional development efforts that can facilitate ICT integration and pedagogical change (Inan & Lowther, 2010).

Linking Beliefs and Technology Use: A Complex Process of Change

The work by Plomp and his colleagues (2009) is indicative of the international scope of the research being conducted to examine the complex, multidimensional relationship between pedagogical beliefs and classroom practice. However, findings are not as clear-cut as initially thought (Fives & Buehl, 2012; Speer, 2008). That is, even if resource barriers have been removed and teachers have embraced student-centered, constructivist beliefs aligned with 21st-century goals, meaningful technology use still may not follow (Tsai & Chai, 2012). There are a host of other variables that can have both a direct and indirect effect on teachers' abilities to translate their pedagogical beliefs into practice, including teacher-related (e.g., knowledge, motivation, confidence), school-related (e.g., leadership, ICT policies), and cultural and societal-related (e.g., parental expectations, standardized testing requirements) (Ertmer et al., 2012; Hermans et al., 2008; Lowther, Strahl, Inan, & Ross, 2008; Ottenbreit-Leftwich et al., 2010; Tondeur, Hermans, van Braak, & Valcke, 2008). As noted by Hu, Clark, and Ma (2003), an individual's decision to integrate technology is affected by multiple key factors including those related to the technology itself, the user, and

the organizational context. Given the complexity of the educational change process, a single “cookbook approach” to affecting teacher change cannot promise success.

One reason for the observed inconsistencies between beliefs and practices relates to the difficulty involved in measuring beliefs (Pajares, 1992; Schraw & Olafson, Chapter 6, this volume). Speer (2008) warned that data collection and analysis methods found in the literature are typically too coarse-grained, comprising broad categories of beliefs (e.g., constructivist) and general aspects of practice (e.g., student-centered), as opposed to focusing on more specific beliefs (e.g., students learn by reflecting on their learning) and actual in-class teaching practices (e.g., use of blogs to capture reflections).

Additionally, there is the general perception that teachers’ beliefs and practices are uni-dimensional (teacher-centered *or* student-centered), as opposed to multi-dimensional (Kerlinger & Kaya, 1959), despite evidence that suggests that teachers hold varying degrees of both kinds of beliefs (Ottenbreit-Leftwich et al., 2010). For example, Tondeur, Valcke, and van Braak (2008) used scores on two educational belief scales (e.g., traditional teaching and constructivist teaching) to develop profiles for the teachers in their study. Results indicated that most teachers possessed both traditional and constructivist teaching beliefs.

These discrepancies between beliefs and practice might be explained by the relative weight teachers assign to different beliefs; that is, when a mismatch occurs, different and weightier beliefs may be at play. This is illustrated by the discrepant case described in the Ertmer et al. (2012) study. Although the teacher in their study engaged students in technology practices, such as drill and practice exercises, that did not appear to align with her student-centered beliefs, another belief, focused on students needing to use technology *in any way*, may have superseded her belief that students learn best via student-centered practices.

Another reason for the observed inconsistencies between beliefs and practices relates to the cultural context in which beliefs are enacted (Ertmer et al., 2012; Polly & Hannafin, 2011). School culture has been shown to be one of the most powerful variables affecting teachers’ decisions (Hennessey, Ruthven, & Brindley, 2005), and can exert strong influence over teachers’ technology practices, even pressuring innovative teachers to conform. As just one example, Hazzan (2003) described how the negative reaction of experienced teachers discouraged novice mathematics teachers from integrating technology into their lessons.

The importance of school culture is supported by the results of a study of 525 primary school teachers (Hermans et al., 2008), in which 18% of the variance in teachers’ computer use related to differences at the school level, suggesting that a set of shared beliefs impacted practice in particular schools. Jacobson et al. (2010) also examined this relationship among teachers in Singapore and concluded that teachers’ uses of both traditional and constructivist practices related to the conflicting messages they received from the government regarding how to organize their classrooms. Although the government encouraged teachers to use more student-centered approaches, they also placed a strong emphasis on performing well on standardized exams.

Thus, while more teachers claim to have adopted a constructivist, student-centered teaching philosophy (Chai & Khine, 2008), they may not yet be ready, or able, to completely restructure their classroom practices (Jacobson et al., 2010;

Song & Looi, 2012), especially when current practices are perceived to meet other important classroom goals (Prestridge, 2012). Furthermore, for curricular change to take hold, teachers will have to determine how to make these new practices fit with other established components of the system. Unfortunately, the system, itself, may make it difficult for teachers to enact innovative strategies (Johnson, 2007). In fact, very few teachers have implemented innovative technology practices without administrative, technical, and curricular support (Wolf, 2012).

Culture and context have repeatedly been described as obstacles to technology integration (Chai et al., 2009; Ertmer & Ottenbreit-Leftwich, 2010; Tearle, 2003). Although culture or peer pressure also can have positive results, there are relatively few examples of this in the literature. Somekh (2008) provides a notable exception, describing how school-wide innovation occurred in three schools in which the principal provided a strong vision and motivation for change. By promoting a model of collaboration and mutual support, positive changes were noted in teacher-teacher relationships. Similarly, Tondeur, Krenshaw, Vanderlinde, and van Braak (2013) described how school factors, including distributed leadership and opportunities to participate in technology planning, helped shape the technology practices of three “advanced” users.

Although it is clear there is no simple cause-effect relationship between beliefs and practices (Chai, 2010), change in teaching practice does appear *linked* to change in beliefs (Guskey, 1986). Speer (2008) characterized the change process as being interconnected, with change in practices and beliefs occurring in a cyclic fashion. Others have described the relationship as reciprocal and occurring over lengthier periods of time (Levin & Wadmany, 2006).

IMPLICATIONS FOR PRACTICE

How, then, can we best support teachers’ adoption of practices that appropriate technology towards the development of students’ 21st-century skills? In this section, we consider the types of support structures needed in our professional development programs.

Professional Development

To enable classroom teachers to use technology in ways that support 21st-century goals, changes will likely be required in teachers’ knowledge, self-efficacy, pedagogical beliefs, as well as in the culture in which those beliefs are enacted (Ertmer & Ottenbreit-Leftwich, 2010). In this chapter, we focus specifically on how professional development can facilitate and support changes in teachers’ *pedagogical beliefs*. Note that we do not necessarily advocate that the best way to change teachers’ technology practices is by changing their beliefs. Sometimes it is just as effective, if not more so, to help teachers adopt new practices, which through their association with supporting beliefs, can initiate subsequent changes in those beliefs (Guskey, 1986; Levin, Chapter 4, this volume).

In general, inservice teachers have strong pedagogical beliefs built from their previous experiences in the classroom, including those as K-12 students. As such, these beliefs tend to be very resistant to change (Tondeur et al., 2012). Yet, early successful

experiences with technology can have a strong influence on teachers' subsequent efforts to achieve technology integration (Ertmer et al., 2006–2007). Additionally, when professional development experiences are situated within the context of teachers' own curricular needs, change is more likely to occur (Koehler & Mishra, 2005). According to Speer (2008), professional development programs have the greatest success in helping teachers adopt reform-based practices when they focus on small, but meaningful aspects of practice. Similarly, Kanaya, Light, and Culp (2005) indicated that the most important feature of a technology professional development program is having a strong focus on helping teachers understand how specific instructional practices and tools support mastery of specific content.

According to Putnam and Borko (2000), one of the best ways to support teacher change is by providing opportunities for teachers to witness how the specific change benefits their students. Research by Ottenbreit-Leftwich et al. (2010) demonstrated that when teachers witnessed the impact of technology on student learning, they were motivated to experiment with additional technologies. In addition, observing others who are successfully implementing student-centered practices can provide novice technology-users with new and powerful images of what it means to be an effective technology-using teacher (Glazer, Hannafin, Polly, & Rich, 2009). These images, then, can increase teachers' perceived need for change as well as their understanding of what these new practices look like. For example, Glazer et al. implemented a six-month "collaborative apprenticeship" to encourage fifth grade teachers to construct and implement technology-enhanced lessons. Upon completion of the program, six of the nine peer-teachers increased their abilities to design and implement technology-enhanced lessons. Most teachers indicated that sharing ideas and making connections with other teachers were powerful change strategies. Finally, teachers report that having access to personal learning networks (via Twitter, blogs, Google Reader) enables them to garner new ideas for practice as well as support for experimentation.

IMPLICATIONS FOR FUTURE RESEARCH

Given the noted inconsistencies between teachers' beliefs and classroom technology use, future research is needed which utilizes more accurate instruments to measure beliefs (see Section II, this volume) in conjunction with a variety of qualitative methods (see Olafson, Salinas, & Owens, Chapter 8, this volume). Current research depends, almost exclusively, on self-report instruments with little or no triangulation provided from classroom observations or other qualitative data sources (Kopcha & Sullivan, 2007). Furthermore, researchers should consider examining beliefs and practices at a finer-grained level as recommended by Speer (2008). That is, rather than focusing on whether teachers have constructivist or traditional beliefs, it might be more productive to examine specific practices (e.g., use of questioning strategies) that are supported by these beliefs, as they tend to be more readily modified (Levin & Wadmany, 2006). The potential benefit of Speer's approach is illustrated by recent work by Song and Looi (2012) and Beyer and Davis (2008), among others. Similarly, Ertmer et al. (2012) observed strong alignment among the beliefs and practices of 11 of the 12 teachers they studied by focusing first on what teachers noted as being important in their classrooms, and second, on the ways in which they used technology to support those expressed goals.

It might be more impactful to direct future efforts toward providing rich description of how current teachers are using technology to support 21st-century goals as opposed to trying to classify underlying beliefs into one camp or the other. Labeling teachers as traditional or constructivist greatly oversimplifies the complex nature of the relationship between beliefs and practice and in many cases, carries negative connotations. By, instead, providing specific descriptions of meaningful classroom technology uses that are supported by student-centered beliefs, we can provide access to new and compelling images that can inform and motivate changes in teachers' pedagogical approaches (Zhao & Cziko, 2001). For example, Kopcha (2010) implemented a systems-based approach to technology integration using mentoring and communities of practice. The evolving mentoring model led to a teacher-sponsored community of practice. By reviewing examples from teachers within their own buildings and utilizing familiar resources, teachers were more likely to implement technology within their curricula. Additional work is needed to validate the generalizability of this approach.

Additional efforts are also needed to determine the efficacy of different interventions designed to change beliefs and/or practice. Based on the difficulty involved in trying to simultaneously effect changes in teachers' technology uses and their pedagogical beliefs and practices (Koehler & Mishra, 2009), it is unclear whether professional development efforts should focus on one aspect or the other or if an integrated approach would be more effective. On the one hand, it might be worthwhile to begin our change efforts by determining what tools teachers currently use in their daily lives (e.g., e-mail, Facebook, Skype) and then helping them consider ways they can use those tools to accomplish classroom learning goals, particularly those directed toward students' attainment of 21st-century skills. Having at least a minimal level of comfort with the specific tools seems essential to teachers' adoption of the tools for pedagogical purposes (Inan & Lowther, 2010).

On the other hand, the ultimate goal is not that teachers embrace technology, per se, but that they embrace the type of pedagogical approaches that benefit from meaningful and authentic technology use. This, then, suggests the need to downplay the tools in favor of student-centered pedagogies that take full advantage of the tools, especially those that target 21st-century skills. Additional research is needed to examine these various alternative approaches and to determine the relative effectiveness of each.

CONCLUSION

Educational reform efforts have consistently purported student-centered practices as the most effective way to prepare our students for the 21st century (Lawless & Pellegrino, 2007). Furthermore, these reform efforts tend to advocate a definition of teaching that includes leveraging relevant ICT resources as meaningful pedagogical tools (Ertmer & Ottenbreit-Leftwich, 2010, 2013). Yet, in order to achieve this goal, a variety of "enablers" must be in place including classroom and school resources, a facilitative school culture with peer and administrator support, opportunities for teachers to gain relevant knowledge, confidence to apply that knowledge in innovative ways, and pedagogical beliefs that support 21st-century practices. Technology integration is not an isolated goal to be achieved separately from pedagogical goals,

but simply the means by which students engage in relevant and meaningful work. Promoting best practice and effective pedagogy is key to achieving effective technology integration. As such, we need to promote and support educational ideas, not technological ones (Watson, 2001).

Although student-centered beliefs are not enough to assure implementation of student-centered practices, they are an important, and necessary, component (Hew & Brush, 2007). As such, there is an urgent need to shift the focus of our technology integration efforts from one that emphasizes obtaining more technology to one that emphasizes the development of the *pedagogical beliefs* that enable teachers to work with current resources to achieve meaningful technology use. By gaining greater insights into the complex relationship between teachers' practice and their pedagogical beliefs, our ability to influence that practice increases in ways that, ultimately, have the potential to impact our students' futures.

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Section VI

Teachers' Beliefs About Learners

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PRESCHOOL TEACHERS' IDEAS ABOUT HOW CHILDREN LEARN BEST

An Examination of Beliefs About the Principles of Developmentally Appropriate Practice

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This chapter will focus on early childhood educators' beliefs about developmentally appropriate practice (DAP). Specifically, this chapter will examine the engagement of early childhood educators in DAP beliefs, the relationship between DAP beliefs and practices and factors that influence this relationship, and implications for the field of early childhood education.

WHAT IS DAP?

DAP is a child-centered educational philosophy that encourages active exploration, integration across the curriculum, and curricular choice (Copple & Bredekamp, 2009). The purpose of this philosophy is to promote exemplary care and education for young children and promote lifelong learning and development. In other words, DAP is a position statement, based on theory, research, and practice, about how children learn best (NAEYC, 2009). This philosophy has influenced educators and scholars in early care and education around the world (McMullen, Elicker, Wang, Erdiller, Lee, Lin, & Sun, 2005).

In addition to discussing how early childhood educators should respond to current demographics and trends in education (e.g., accountability/standards, English Language Learners, children with special needs, etc.), the NAEYC document also weighs in on ways in which teachers should approach educating young children. For example, educators are encouraged to increase and maintain knowledge regarding

child development in general, the development of children as individuals, and the cultural and social contexts within which children live. Additionally, this knowledge is then expected to be applied to the following elements considered to be important to creating learning environments for young children: creating a caring community of learners, teaching to enhance learning and development, planning curriculum to achieve important goals, assessing children's learning and development, and establishing reciprocal relationships with families. Therefore, early childhood educators need to both consider the development of young children in a sociocultural context, as well as how these factors influence teacher's interactions with children and families, teaching and curricular strategies, and assessment and planning.

The importance of this type of curricular approach is borne out in the literature. Children who attend developmentally appropriate preschool programs tend to fare well (Mashburn, 2008; Marcon, 2002; Montie, Xiang, & Schweinhart, 2006). For example, children who are exposed to high quality, developmentally appropriate care are better prepared to enter school, do better academically and socially, and have fewer social and psychological problems later in life (Magnuson, Ruhm, & Waldfogel, 2007; Mashburn et al., 2008; U.S. Department of Health and Human Services, 2010; Winsler et al., 2008). Alternatively, classroom quality has been found to be lower in classrooms where teachers do not believe in DAP (Pianta et al., 2005).

ENDORSEMENT AND EMPLOYMENT OF DAP

Given the importance of providing DAP to young children, how likely are early childhood teachers to endorse and/or employ this pedagogical practice? With regard to endorsing DAP, it appears that many early educators do espouse the importance of DAP, although such endorsement is impacted by factors such as educational attainment and specialized training (Buchanan, Burts, Bidner, White, & Charlesworth, 1998; File & Gullo, 2002; McMullen et al., 2005; Rentzou & Sakellariou, 2011). Employment of DAP is more complicated and may occur at a lower rate than self-reported beliefs regarding the utility of DAP. While many researchers do find that early childhood educators who believe in the importance of DAP practice it (Rimm-Kaufman, Storm, Sawyer, Pianta, & LaParo, 2006; Sakellariou & Rentzou, 2012), others note a rift between beliefs and actions (Rentzou & Sakellariou, 2011; Wilcox-Herzog, 2002).

Possible variables that may account for discrepancies between teachers' beliefs and practices include teacher education (type and amount), cultural factors, tension between a perceived need for teacher control and child directedness, a gap between knowledge and application, and structural constraints such as time, materials, and available staff (Blay & Ireson, 2009; Hindman & Wasik, 2008; Kabadayi, 2010; Wang, Elicker, McMullen, & Mao, 2008). For example, McMullen et al. (2006), found that some classroom practices (e.g., inclusion of free play time, pre-planned curriculum) were more indicative of DAP beliefs, than variables such as inclusion of creative arts and occasional group time instruction. Therefore, it is important to determine how practitioners employ DAP in their work with young children. One line of investigation is teachers' beliefs. Since we know that actions are filtered through teachers' beliefs (Fives & Buehl, 2008), perhaps the belief-action congruency/discrepancy is because teachers do not actually believe in DAP. If teachers do believe in DAP, what

might prevent them from actualizing their beliefs? This question begets a second line of investigation, examining teacher behavior.

MEASURING DAP BELIEFS AND BEHAVIORS

Typically studies interested in teachers' DAP beliefs and behaviors have two main purposes. First, researchers are interested in describing teachers' beliefs about DAP, and second, they are interested in assessing congruence between beliefs and practices. To assess teachers' beliefs many researchers use measures that offer a list of belief options that utilize a Likert scale (Rimm-Kaufman et al., 2006). Other assessment tools offer either/or choices. Critics argue that these tools might miss the subtleties of choices that are more nuanced and complex (Hindman & Wasik, 2008). Much research examining preschool teacher's beliefs about DAP uses the Teacher Beliefs Scale (TBS) and the Instructional Activities Scale (IAS) which are based on NAEYC's-DAP position statement (Charlesworth, Hart, Burts, & Hernandez, 1991; Wang et al., 2008). The TBS assesses teacher's beliefs about the validity of DAP. It is composed of 30 items designed to evaluate how important specific teaching practices are to the respondent (i.e., the teacher's beliefs); each item is rated on a 5-point Likert scale where 1 is not important at all and 5 is extremely important. The IAS consists of 31 items (rated on a 5-point scale) and measures how often teachers believe they implement such practices in their classrooms.

As noted by McMullen et al. (2005, pg. 456):

The TBS and IAS are widely used and popular instruments with early childhood education and care researchers; these instruments are based on the first policy statement concerning DAP published by NAEYC (Bredenkamp, 1987). The validity of the instruments were established by Charlesworth et al. (1991), Charlesworth, Hart, Burts, Mosley, and Fleege (1993), Hart, Burts et al. (1998) and Hart, Nelson, Robinson, Olsen, and McNeilly-Choque (1998) in a series of observational studies used to confirm practitioners' responses on the TBS and IAS instruments.

While these tools are credited with being both reliable and valid, it is important to remember that the TBS and the IAS constitute self-reports of teachers' beliefs and behaviors. In each, teachers are asked to estimate their beliefs and practices. As is true with all self-report measures, there is a danger in over- or underestimating what teachers believe or what they are actually practicing in their classrooms. This is important to keep in mind when reviewing studies measuring the beliefs and instructional activities of early childhood educators in relation to DAP.

RESEARCH FINDINGS ON DAP BELIEFS AND BEHAVIORS

Studies using the TBS and IAS (as well as other measures) have assessed various factors that influence teachers' beliefs about DAP and the relationship between beliefs and actions (see Table 24.1). These studies have determined that there is educational and structural variation with regard to beliefs about DAP and the relationship between beliefs and practices both within and across cultures. Education and specialized training can increase the likelihood that teachers more strongly endorse

Table 24.1 Studies Examining Beliefs and Behaviors

Source	Cross-Cultural Sample		Behaviors Assessed	Belief-Behavior Congruence?	Factors Impacting Belief-Behavior Congruence				
	Beliefs Assessed				Education Amount	Education Type	Special Training	Experience	Structural Issues
Abu-Jaber, Al-Shawareb, & Gheith (2010)	Yes	Self-report, author created	No	N/A	Yes			Yes	
Elicker, Huang, & Wen (2003)	No	TBS	ECTBO	Yes	Yes				
File & Gullo (2002)	No	Modified TBS	No	N/A		Yes			
Hedge & Cassidy (2009)	Yes	TBS	TBS & CPI	Yes					Group size & T/C ratio
Heisner & Lederberg (2011)	No	TBS	IAS and EC Survey	Yes			CDA training		
Kim (2004)	Yes	Author created survey	Observation	No	Yes				Low funding
Kwon (2004)	Yes	Author created survey	Author created survey	No					Culture, class size, ratio
Lee et al. (2006)	Yes	TBS	Scaffolding observation	Yes			Scaffolding training		
McMullen (2003)	No	Yes (TBS)	IAS	Yes	Yes	Yes		Yes	
McMullen et al. (2005)	Yes	TBS	IAS	Moderate					Culture
Trepanier-Street et al. (2007)	No	Author created survey	No	N/A			Literacy training		
Wang et al. (2008)	Yes	BS	IAS	Moderate					Culture

DAP practices and principles (Heisner & Lederberg, 2011; Wang et al., 2008) and that education related to early childhood might produce beliefs most in alignment with DAP (File & Gullo, 2002). Structural variables may influence the relationship between beliefs and behaviors by allowing teachers to more easily practice what they preach (Hedge & Cassidy, 2009; Jones, Burts, Buchanan, & Jambunathan, 2000; McMullen et al., 2000). For example, when teachers have fewer children in their classrooms it may be easier to implement DAP (Hedge & Cassidy, 2009).

In addition to information gleaned from U.S. samples, much cross-cultural information is available with regard to DAP beliefs and practices. This is because many

countries have either moved towards touting the importance of DAP and are working to implement this style of education or are beginning to consider this style of education within the context of their current early education systems (Abu-Jaber, Al-Shawareb, & Gheith, 2010; Hedge & Cassidy, 2009; Kim, 2004; Kwon, 2004; Lim, 2010; McMullen et al., 2005). For this reason, international interest in teacher's beliefs about DAP have risen over the last decade or so. Many of the studies discussed below use international samples from one or more countries outside of the United States.

Educational/Experiential Context and DAP

Education, experience, and specialized training are important pieces of the puzzle with regard to DAP beliefs and practices. Teachers (both within and outside of the United States) with higher educational attainment and more specialized training related to early childhood education and DAP, tend to believe more strongly in the importance of DAP and have beliefs and practices with better alignment. Additionally, it is sometimes found that teachers with more experience more highly espouse and practice DAP than teachers with less experience.

Education. Both type and amount of education appear to be important to DAP beliefs and practices and the congruency between these two constructs. Teachers who have higher degrees (i.e., a B.A.) tend to hold stronger beliefs about the importance of DAP and are more likely to practice these beliefs than teachers with fewer years of education (McMullen & Alat, 2002). These results hold true both in studies that use the TBS and the IAS, as well as other measures of teachers' beliefs/behaviors.

Amount of education. Abu-Jaber et al. (2010) recruited 285 female Jordanian kindergarten teachers and had the teachers complete a questionnaire based on elements of DAP. These teachers generally believed in DAP and there were not education differences among teachers with regard to their beliefs about DAP except in one area. Teachers with bachelor's degrees were more likely to believe in the importance of DAP child assessment than were teachers without degrees. Furthermore, as teachers gained more experience, their DAP beliefs became stronger.

Elicker, Huang, and Wen (2003) asked 45 preschool teachers to complete the TBS to assess beliefs; then the teachers were observed with the Early Childhood Teacher Behavior Observation, which assesses actual behavior related to the TBS. The results of this study showed that teachers with higher levels of education and training were most likely to endorse and engage in DAP.

Lastly, Wang et al. (2008) recruited 296 Chinese and 146 U.S. early childhood educators and assessed them with the TBS and IAS. Moderate relations between beliefs and practices were found. The authors noted that U.S. teachers more likely to tout the importance of child centered learning than Chinese teachers were with Chinese teachers working in rural areas being the least likely to espouse DAP. The results also demonstrated that U.S. teachers with college degrees were the most likely to support the use of DAP.

Type of education. Although years of education are important in and of themselves, type of education is important also. Teachers who have pursued degrees in early childhood education, have beliefs and practices more in alignment with DAP than teachers with an educational background in elementary education (McMullen, 1999).

For instance, McMullen (2003) measured the beliefs of 815 preschool teachers with the TBS and the IAS. Of these 815 teachers, 10 were sampled to assess both beliefs and behaviors. Participating teachers had varying educational backgrounds. The results showed that DAP beliefs and practices were higher for teachers who had more education than a high school diploma, for teachers with an early childhood educational background (rather than elementary education), for teachers with more experience, and for teachers who actively participate in professional development.

File and Gullo (2002) recruited 119 preservice teachers employed in either Early Childhood Education or Elementary Education teacher-training programs. Teachers were asked to complete a modified version of the TBS for elementary school teachers (which included instructional and activity beliefs). Results showed that most of the teachers believed in DAP, although quite a few liked the inclusion of some teacher-directed activities (this was more likely for elementary education students than early childhood education students).

Similar findings were noted by Jones et al. (2000) who assessed 18 preschool and kindergarten teachers with the TBS and the IAS. Classroom behaviors were also assessed with the Checklist for Rating Developmentally Appropriate Practice in Kindergarten. Generally, these teachers (particularly those who had educational experience related to early childhood education) believed in the importance of DAP. Additionally, their self-reported and actual practices were somewhat indicative of DAP, although not as strongly indicative as their stated beliefs.

Specialized Training. Specialized training refers to professional development opportunities offered through places of employment, professional developmental opportunities sought out by individuals in the field independently, or structured opportunities related to research. While much research highlights the importance of formal education, specialized training affords a viable means of gathering information on the relationship between teachers' beliefs and classroom practices.

Two examples of researchers examining professional development opportunities sought out by individuals are Heisner and Leiderberg (2011) and Trepanier-Street, Adler, and Taylor (2007). Heisner and Lederberg (2011) assessed 76 early childhood teachers enrolled in Child Development Associate (CDA) courses and 50 comparison teachers. Teachers were asked to complete the TBS and IAS (preschool version) and the Early Childhood Survey of Beliefs and Practices (Marcon, 1999). The results of this study showed that there were correlations between teachers beliefs and self-reported practices and that participation in CDA training increased alignment with DAP.

Trepanier-Street et al. (2007) explored the impact of training and education. They assessed 941 college students who participated in the Jumpstart Program (a literacy program designed for young children). Students participating in this program receive approximately 300 hours of training, practicum, and community service. Participants were asked to complete a survey at the beginning and end of the program tapping into their understanding of DAP and child development. The results of this study showed that participant's scores increased over the course of the training (i.e., students more strongly endorsed DAP).

An example of training provided via a research study is discussed in a study by Lee, Baik, and Charlesworth (2006) who asked preschool teachers in South Korea to complete the Teacher Beliefs Survey (TBS). Teacher's responses on the TBS were used to determine if their beliefs were more in keeping with developmentally appropriate

or traditional practice. Teacher behavior was then assessed in terms of scaffolding a child on a puzzle task. The researchers then provided teachers with training in scaffolding children's learning and then once again assessed teacher scaffolding (this time on a reasoning task). The results showed no difference between holding beliefs endorsing DAP and more traditional teachers on their initial use of scaffolding (i.e., before training in scaffolding), but the results did show that DAP teachers were more likely to use scaffolding after training. These findings demonstrated the role that education and/or specialized training may contribute to congruency between beliefs and actions.

All three of these studies show that when teachers have the opportunity to participate in training designed to increase beliefs about DAP or practical skills related to the implementation of DAP, that such experiences can have an impact on their beliefs and behaviors.

Experience. Several of the studies mentioned in the earlier sections of this chapter related to education type and amount, highlight the importance of experience to beliefs and behaviors as well. For instance, McMullen (1999, 2003) found that teachers who have more years of experience with young children are more likely to say they believe in DAP and practice it than teachers with fewer years of experience. Abu-Jaber et al. (2010) also found that even for teachers who believed in DAP, those beliefs were strengthened with continued experience with young children.

Structural Context and DAP

Although much of the research regarding teachers' beliefs and behaviors related to DAP center around education, specialized training, and experience, some scholars interested in this topic focus on structural issues that might affect teachers' beliefs and behaviors and the congruency/discrepancy between the two. Other factors relevant to the connection between what teachers believe and what they actually do in the classroom include structural constraints such as classroom size and specific facets of classroom practice such as structure of the day. Teachers often note that they are unable to practice their beliefs due to barriers such as administrators, curriculum requirements, resources, and parents (Jones et al., 2000). These barriers may be particularly pronounced across cultural contexts. For example, McMullen et al. (2005) assessed early childhood education teachers in the United States, China, Taiwan, Korea, and Turkey with the TBS and the IAS. The results showed congruence between beliefs and practices in all countries (this link was weakest in China, strongest in the United States, and moderate everywhere else). The authors hypothesized that the link was strongest in the United States due to the fact that NAEYC's DAP document originated in the United States, and American teachers may have the most familiarity both through their education and experiences.

Hedge and Cassidy (2009) assessed 40 kindergarten teachers in India with the TBS, the Instructional Activities Scale (IAS), and the CPI (Classroom Practices Inventory—which measures actual classroom practice). The results of this study found that there was congruence between beliefs and practices, particularly for teachers with enriched ratios and group sizes (i.e., that is more teachers per child).

Kwon (2004) used an author created measure to assess the beliefs and classroom behaviors of 84 kindergarten teachers in Korea. The purpose of this study was to

assess use of the national kindergarten curriculum (which is defined by the authors of the study as being fairly DAP). The authors showed that although teachers generally believed in DAP, they did not practice their beliefs. The author noted that this is likely due to large class sizes and teacher/child ratios, and that the rift between beliefs and actions may also reflect traditional Confucian beliefs. Kim (2004) conducted a qualitative study with four South Korean novice teachers. Beliefs were assessed with a semi-structured interview and teachers were observed to assess their classroom behavior. The results found a discrepancy between beliefs and actions thought to be related to a lack of funding for kindergarten in South Korea, parent's traditional beliefs about education, and the low education levels of teachers.

In summary, teachers who have education and specialized training (across cultures) tend to espouse the importance of DAP. In addition, out of the 12 studies reviewed, all found that either educational, training, or structural factors impacted the degree to which teachers tout the importance of DAP. With regard to congruency between beliefs and behaviors, 9 of the 12 studies reviewed assessed teacher behaviors and 7 out of those 9 found that beliefs and behaviors were at least moderately correlated (particularly for teachers with higher levels of education and specialized training and for those not hindered by structural constraints). From this research it might appear reasonable to conclude that there is an association between teachers' beliefs about the importance of DAP and their behaviors. The trouble with this conclusion is that much of the literature examining beliefs and behaviors about DAP relies on self-reported practices rather than measures of actual practice. Of the 9 studies reviewed that measured practice, only 4 included an observational measure of teacher behavior. Moreover, only 3 paid explicit attention to structural factors such as teacher-child ratio and group size that may impact the correspondence between beliefs and behaviors.

Examining DAP Beyond Self-Report

A study recently completed by the authors of this chapter aims to rectify the deficiency related to measuring teacher behavior and provide additional insight into the belief-action relationship (Wilcox-Herzog, Ward, Wong, & McLaren, 2013). In this study, teachers were asked to provide self-report measures of behavior but behaviors were also directly evaluated with two observational measures. Additionally, the authors accounted for education and/or specialized training.

The 59 participants in the Early Childhood Training Program (ECTP) completed three surveys designed to measure beliefs. The first and second surveys were the TBS and IAS scales described earlier in this chapter. The third survey was the Beliefs and Intentions Questionnaire (BIQ; Wilcox-Herzog & Ward, 2004), which measures perceived ability to practice beliefs, beliefs about how often teachers should engage in specific DAP behaviors (on a 5-point Likert scale), and intentions regarding engaging in DAP behaviors with children (on a 5-point Likert scale). Finally, teacher behaviors were assessed with the Early Childhood Environment Rating Scale Revised (ECERS-R; Harms, Clifford, & Cryer, 2005), the Early Language and Literacy Classroom Observation—Research Edition (ELLCO; Smith & Dickinson, 2002), and the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008). The Early Childhood Environment Rating Scale assesses the overall quality of

classroom environments, the ELLCO assesses literacy and language opportunities, and the CLASS measures teacher-child interactions.

Results from the TBS, IAS, and BIQ showed that teachers more strongly endorsed the importance of DAP than traditional teaching practices. Similarly, and not surprisingly, teachers also reported stronger intentions to use DAP as opposed to traditional teaching activities.

With respect to the congruence between beliefs and intentions (i.e., what teachers reported themselves to be doing in their classrooms) teacher responses highlighted a significant correlation between beliefs and intentions. This suggests that there is a correspondence between what teachers believe to be important and what they report engaging in within the classroom.

A final component of the ECTP sought to examine the association between beliefs, intentions, and actual classroom practices. Based upon the data from this project, there appear to be few significant relations between beliefs, intentions, and actual behavior regardless of education and/or specialized training.

Although the results of this study add to the growing body of literature examining DAP beliefs and behaviors, particularly as behaviors were assessed more objectively than what self-report data can provide, the information gleaned from this study is but one piece of a complex puzzle that requires further fleshing out. Taken together, the results of this study, and the studies reviewed earlier in this chapter, suggest that the relationship between beliefs and actions with regard to DAP is not a given. It is probably safe to assume that teachers need support in the form of education, specialized training, and in reducing structural barriers that make it difficult to implement DAP beliefs.

IMPLICATIONS FOR INCREASING BELIEF-ACTION CONGRUENCY

From the review of the literature it appears that early childhood educators do believe in the importance of DAP, they may just find it difficult to implement in their actual practice with young children. If this is indeed the case, how can we help teachers to engage in behaviors more in keeping with DAP?

Address Structural Constraints

It is important to remove the structural constraints that prevent some teachers from doing what they believe. Jones et al. (2000) noted that a large number of teachers leave the profession within the first 10 years (due to pressures such as state/school curriculum, student behavior, lack of self-efficacy, and administrative support for DAP) and that teachers need support in implementing DAP. If and when structural constraints are removed, then it becomes imperative to change the structure and nature of teachers' beliefs and hopefully, in doing so, change teacher practices as well.

Opportunities for Educational and Specialized Training

It is important to provide future and current early childhood educators with educational and specialized training opportunities. As demonstrated in the studies

described above, teachers were most likely to exhibit belief-behavior congruency when they held more education and/or specialized training. This highlights the critical nature of providing early childhood educators with educational opportunity. If teachers are going to walk the walk, and not just talk the talk, they need experiences that will enable them to implement their beliefs.

The importance of education has been borne out by other researchers as well. Scholars have shown that the best way to increase quality of care is to train and educate teachers to provide exceptional caregiving environments and to work in a maximally effective way with all children. Researchers indicate that when teachers have more specialized training and education in early childhood, they are more sensitive, playful, and involved, and they provide better activities. In addition, teachers with training and education tend to provide higher quality care overall (Arnett, 1989; Bromer, Van Haitsma, Daley, & Modigliani, 2009; Cassidy & Buell, 1996; Howes, Whitebook, & Phillips, 1992; Kontos, Howes, Shinn, & Galinsky, 1995).

Maximize Existing Educational Experiences by Focusing on Beliefs

In addition to providing early childhood educators with opportunities to pursue education and specialized training, it is important to provide opportunities that maximize the education and training that they receive. This emphasizes the critical task of not just providing more education and training, but considering the best way in which to structure educational opportunities.

One way to maximize educational opportunity is to determine if the beliefs teachers hold are implicit or explicit. Implicit beliefs are those that develop and reside in the subconscious, whereas explicit beliefs are deliberately formed and known to the beholder. Implicit beliefs are slow to form, forged gradually through experience, and stable (Carpenter & Banaji, 2001; McMullen & Alat, 2002); on the other hand, explicit beliefs are based on the accumulation of factual information and are dynamic (Roehler, Duffy, Herrmann, Conley, & Johnson, 1988). Often, implicit theories are personal and are discovered experientially by individuals whereby explicit theories are derived via research by scholars working in particular areas of expertise (Saracho, 2012).

Rydell and McConnell (2006) suggested that these two belief systems evolve from different cognitive processes and that they change or are responsive to different types of information. They noted that implicit beliefs change slowly and are susceptible to subliminal prompts, whereas explicit beliefs change quickly in response to consciously available information. Cohen, Peters, and Willis (1976) noted that teacher training programs can be conceptualized as an acculturation paradigm in which beliefs are modified and molded slowly over time. Moreover, within this paradigm, even explicit beliefs are expected to take time to develop. In other words, engagement in educational, professional, and personal activities changes and reconstructs beliefs as teaching practitioners reflect on and process their experiences and acquire increased levels of knowledge (Hindman & Wasik, 2008; Sakellariou & Rentzou, 2012). It is also thought that beliefs are often deeply held and may be resistant to change in the absence of self-reflective, dissonance producing activities (Heisner & Lederberg, 2011) and that new information most closely related to implicit beliefs will be easiest to change (Carpenter & Banaji, 2001; Daniels & Shumow, 2003; Fazio, Zanna, & Cooper, 1978; Lee, Baik, & Charlesworth, 2006; Nespor, 1987; Rath, 2001).

Rydell and McConnell (2006) noted that explicit beliefs generally change quickly with a small amount of information presented in opposition to a learner's current beliefs, whereas implicit beliefs generally do not change unless significantly more counter-attitudinal information is presented. They noted that implicit beliefs constitute a "slow-learning system" (Rydell & McConnell, 2006, pg. 996) of reasoning. This suggests that implicit attitude change requires substantial counter-attitudinal information presented over a long period of time. Professional preparation programs provide one opportunity to present information in this way and potentially impact and change the implicit beliefs of potential teachers. Berthelsen and Brownlee (2006) asserted that people are often reluctant to abandon deeply held personal (or implicit beliefs) and that professional preparation programs need to provide up-and-coming practitioners with opportunities to explore both the affective and cognitive components of their beliefs in concert with accurate theory and research related to best practice with young children.

Raths (2001) suggested several tools available to educators working with early childhood teachers, which might be effective in changing implicit teachers' beliefs. First, he suggested providing practitioners with dissonance producing experiences. This is where previous beliefs are juxtaposed against new information. For example, many providers believe that DAP and traditional practices are a dichotomy and that one cannot include elements of both in practice. Tzuo (2007) notes that this might be a false dichotomy. According to Tzuo, the primary difference between DAP and traditional approaches to education are in the balance between teacher and child control over learning. He encourages teachers to consider multiple perspectives when implementing practice rather than just following the status quo. This type of integration of information lends itself well to dissonance producing educational experiences and encourages students to think critically about the material presented. Brownlee and Berthelsen (2006) concur that practitioners need to be encouraged to think deeply and critically when presented with theory and practice related to young children. They assert that teacher educators need to focus on student's personal epistemological beliefs and use these beliefs to encourage questioning and critical evaluation.

Raths also suggested providing apprenticeship opportunities that allow newly formed beliefs to be "activated." Typically, for teachers, apprenticeship experiences take the form of practicum, internships, or student teaching opportunities. Cohen, Peters, and Willis (1976) examined type and length of practicum experience and how these variables related to changes in beliefs. They included 55 beginning and 25 advanced undergraduates studying early childhood education. Their results showed that student's beliefs changed over the course of their student teaching experience to be more closely aligned with the theoretical orientation of the program they were placed in. This suggests that in addition to previous coursework, the "apprenticeship" experience also influenced the beliefs of these preservice teachers.

Another suggestion from Raths (2001) is that teacher educators should promote movement through the stages of professional development. One way to do this is to encourage teachers to develop their teaching self-efficacy. Self-efficacy encompasses knowledge, skills, and dispositions (e.g., confidence in ability and potential success; Gist & Mitchell, 1992). Teaching self-efficacy has been shown to have a relationship to both classroom practice and student outcomes (Prieto & Altmaier, 1994).

Lamorey and Wilcox (2005) found that early intervention teachers gained increasing self-efficacy with experience and suggest that time in the field is one facet of professional development that leads to feelings of being efficacious. Increasing self-efficacy may have a two-pronged outcome of both increasing the likelihood that DAP is practiced and in helping to retain professionals in the teaching profession.

Finally, Raths encouraged practitioners to clarify their values through self-reflection and examination. Teachers should be encouraged to think carefully about their beliefs and practices and to consider strategies and ideas previously unexplored. For instance, Baum and King (2006) note that preservice teachers should explore their personal characteristics, beliefs, and attitudes about the profession of teaching and young children as learners. This is highlighted in a study by Kowalski, Brown, and Pretti-Frontczak (2005) which found that providing preschool teachers with the use of a formal assessment tool (designed to rate the skills and abilities of children) can induce teachers to change their beliefs about what and how children should learn. This suggests that teachers are capable of reflecting on their current practice and are able to use new information to change their beliefs and practices.

In summary, although early childhood educators appear to espouse the importance of DAP and many appear to be able to put their beliefs into practice, others (particularly those with less education and training) need support in actualizing their ideas about how young children learn best. Teachers currently in the field need support from parents, administrators, and from the larger culture. When teachers are able to focus on the children they serve rather than funding, social pressure, and other structural constraints, they will be more likely to practice what they preach. Second, teachers coming into the field and those at lower levels of expertise currently in the field need thoughtful, stimulating educational experiences designed to help them carefully consider and strengthen their beliefs so that they are more likely to carry these beliefs forward with them in practice. The educational suggestions described above imply that that beliefs, intentions, and behaviors are not static, but dynamic. There are potentially numerous strategies that may be employed to support each teacher's insightful consideration of him/herself as a teacher. It is hoped that such insightful reflection will be the basis of exceptional teachers and teaching and will result in an increase of DAP in the field.

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25

TEACHERS' BELIEFS ABOUT CULTURAL DIVERSITY

Problems and Possibilities

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Teachers' beliefs about and attitudes toward cultural diversity are both problematic and promising. Because these beliefs have profound consequences for the learning opportunities African, Asian, Pacific Islander, Latina/o, and Native American students receive in classrooms, they need to be carefully analyzed. The intent of this discussion is to contribute to these analyses by examining research and scholarship on some of the most prominent beliefs among pre- and inservice teachers, and the implications of these beliefs for implementing effective instructional programs and practices for culturally diverse students. To accomplish these goals four major topics are explored. These are (1) the current status of research and scholarship on teachers' beliefs about cultural diversity; (2) what research reveals about teachers' beliefs related to cultural diversity; (3) the importance of teachers' beliefs in teaching and learning; and (4) implications of research on teachers' beliefs for transformative educational actions pertinent to cultural diversity.

STATUS OF THE STUDY OF TEACHERS' BELIEFS ABOUT CULTURAL DIVERSITY

Research and scholarship on teachers' beliefs about cultural diversity and their often ambivalent and conflicted nature have increased since the early 1990s, but there are still significant gaps in the body of knowledge. For example, speculative and theoretical discussions, and personal anecdotes of educators involved in pre- and inservice multicultural teacher education are more extensive than research studies. And, most currently available research data on teacher attitudes and beliefs about cultural diversity derive from small-scale qualitative case studies involving one or a very few researchers, and small numbers of participants (sometimes only one). In many instances the researchers are studying students who are presently or were previously enrolled in their teacher education classes dealing with some variation

of multicultural education or cultural diversity (e.g., White, 2011; Schofield, 2010; Milner, 2006; Causey, Thomas, & Armento, 2000).

A cursory review of the titles and abstracts of 100 entries that dealt most directly and explicitly with teachers' beliefs about cultural diversity produced by a Google search and the University of Washington libraries worldwide website, along with analyses of the research studies included in this discussion revealed some other startling information. First, practicing classroom teachers are largely absent from the research studies and scholarship reported. Instead, almost all research studies and conceptual or theoretical essays involve prospective teachers. In fact, only three studies dealing with practicing teachers appeared in the Google listings, and only one among the University of Washington list of resources. Classroom teachers' beliefs and attitudes about cultural diversity may be examined under other headings, and as part of more broad-based discourses such as topics in professional textbooks, edited anthologies, and research handbooks and encyclopedias. For example, teachers' attitudes and beliefs are frequently part of conceptual and theoretical scholarship on multicultural education, such as that of Banks and Banks (2004; 2013), Bennett (2010), Gay (2003), Grant and Sleeter (2011), Pang (2005), and Valenzuela (1999).

A second revelation is very few prospective teachers of color are being studied. Virtually all of the research involves European American teacher candidates. While this concentration is understandable given the demographics of the teaching profession (both members already in practice and candidates in the pipeline), which is at least 84% European American (Feistritzer, 2011), it creates a knowledge gap that needs to be closed. The few studies involving teachers of color that do exist suggest they have some of the same beliefs about teaching ethnically, racially, and culturally diverse students as their European American counterparts, especially if they share middle class economic backgrounds.

Third, there is an absence of research studies of teachers' perceptions of themselves as culturally diverse others. Even the growing body of research on whiteness (see for example, McIntyre, 1997; G. Howard, 1999; Marx, 2006; Lea & Sims, 2008; Halley, Eshleman, & Vijaya, 2011) does not include this as a primary unit of analysis. Instead, the focus is on how teachers, teacher educators, and others come to understand whiteness as social, political, economic, educational, and cultural dominance. While findings to the effect that white teachers frequently do not consider themselves as cultured and racialized beings are mentioned, they tend to be ancillary to the major concerns for developing their sensitivity to being benefactors and perpetrators of the advantages associated with white identity, power, and privilege. McIntyre's (1997) *Making Meaning of Whiteness* and G. Howard's (1999) *We Can't Teach What We Don't Know* are illustrative of these research trends. Studying the hegemony and dominance of whiteness in teacher preparation for and practice in cultural diversity is crucial, but there are other dimensions of the cultures of European American teachers and their associated beliefs and behaviors that must be understood, just as the cultures of groups of color are not analogous to only problems and limitations.

Similar research needs and results are evident for teacher educators, and instructors of other disciplines in universities outside of colleges of education. The few available studies on teacher educators tend to focus on their perceptions of teacher candidates' beliefs, needs, and competencies, and the effects of multicultural

education courses, rather than their own personal and professional beliefs about themselves and others as cultural beings and actors (see, for example, Milner 2006; Brown, 2004; Johnson, 2002; Causey, Thomas, & Armento, 2000; Cochran-Smith, 1995). This absence of knowledge is important since it is probable that teacher educators' beliefs and behaviors have some direct and consequential effects on the learning experiences teacher candidates receive during their academic preparation that ultimately affect their classroom instructional attitudes and actions.

A fourth trend evident in current research is not specifying what kinds of teachers' beliefs are attached to which aspects of cultural diversity, nor are ethnic groups specified, except for occasional references to African and Latino American prospective teachers, and teachers' beliefs about teaching African, Latino, Native, and Asian American students. But what exactly is the target of these beliefs is not identified beyond issues related to large categories of race, social class, and language diversity. For instance, while research and scholarship may examine teachers' beliefs associated with teaching children of poverty, these are not specified by race, ethnicity, and gender within social class. Similarly, teachers' attitudes toward and beliefs about non-native speakers of English are not analyzed separately by languages such as Chinese, Korean, Ethiopian, and Tagalog. It is likely that teachers do not have the same beliefs about teaching various components of cultural diversity, nor different ethnic and racial groups, or how cultural diversity functions in various circumstances. For example, some teachers may be inclined to believe that the goals of cultural diversity are more appropriate and achievable for secondary than elementary students; others may believe that some cultural diversity issues, such as racism, white privilege, and empowering students for social, civic, and political transformation are too controversial and potentially volatile to be taught at all. Much is written about conceptions of the "model minority" in which teachers (and others) have positive beliefs about Asian Americans, and high expectations for their social and civic behaviors, academic performance, and career and economic success (S. J. Lee, 2009; Li & Wang, 2008; Wong & Halgin, 2006). But, which particular Asians are "model minorities" is frequently not specified. Conversely, some teachers may believe African American males cause more disciplinary and management problems in classrooms than African American females, and both males and females from other ethnic groups. Thus, research and scholarship that analyze teachers' beliefs about cultural diversity monolithically leave important details undetected that could be useful to implementing more appropriate educational change strategies.

A fifth trend in recent research is examining teachers' beliefs separate from concomitant behaviors, although there is strong agreement among educators that beliefs and behaviors related to cultural diversity are closely linked. According to Murrell and Foster (2003), this tendency has three major limitations. First, if the intent of research is to facilitate behavioral modifications it does not accomplish its goal since transforming teachers' beliefs about cultural diversity does not ensure changes in teaching behaviors. Murrell and Foster defined a belief as only the mental acceptance of the validity or truth of an assumption or contention, and declared that there are no inherent behavioral dimensions in beliefs. They also suggested that it is better to concentrate on the dispositions of teachers toward cultural diversity because they can be observed and assessed directly in performance but beliefs cannot. They defined dispositions as beliefs enacted in behaviors. Second, the current

focus on changing European American teachers' beliefs and attitudes toward cultural diversity overshadows other needs and possible techniques for responding to ethnic, racial, and class issues in teaching and learning, such as the recruitment, retention, and culturally responsive preparation of pre- and inservice teachers of color. The need for more teachers of color is established in educational discourse but little progress is being made in actualizing it. Third, according to Murrell and Foster (2003), the emphasis on beliefs about and attitudes toward cultural diversity in teacher education has been more reactive than proactive. Changing teachers' stereotypical thinking and racial biases is reactive, while analyzing dispositions underlying successful instructional practices with diverse learners is proactive.

This conception of proactive strategies for examining teachers' engagement with cultural diversity is reminiscent of proposals by scholars such as Boykin (2002), Gay (2010a, 2010b), and Milner (2009) to shift the focus in teaching diverse students from problems to possibilities, or to emphasize strength-based teaching and learning rather than perpetuating problems-based and pathological orientations if Murrell's and Foster's (2003) "proactive priorities" were more prominent in research on teacher preparation for cultural diversity, more data would be available on actual classroom instruction and practicing teachers than currently exist.

A sixth feature of the current status of research on teachers' beliefs about cultural diversity is the consistency across time of the results. Although studies conducted in the 1980s and early 1990s tended to be on a larger scale, were more quantitative (particularly surveys), and were often supported by teacher education organizations such as the American Association for Colleges of Teacher Education (AACTE) compared to more recent small-scale, qualitative, and individually conducted ones (for example, White 2011; Milner, 2006; Lea & Sims, 2008; Brown, 2004), the findings are highly consistent. After reviewing research conducted between the 1960s and early 1990s, Zeichner (1996) reached a conclusion in the mid-1990s that is still apropos today. He said,

Research has also shown that many teacher education students come to their preparation programs viewing student diversity as a problem rather than a resource; that their conceptions of diversity are highly individualistic (e.g., focusing on personality factors like motivation and ignoring contextual factors like ethnicity); and that their ability to talk about student differences in thoughtful and comprehensive ways is very limited. . . . These students generally have very little knowledge about different ethnic groups in the United States, their cultures, their histories, their participation in and contributions to life in the United States . . . and often have negative attitudes about cultural groups other than their own. (p. 137)

WHAT TEACHERS BELIEVE ABOUT CULTURAL DIVERSITY

There are several areas of consensus in the research findings on teachers' beliefs about cultural diversity. The findings reported by White (2011), Jennings (2007), Trent, Kea, and Oh (2008), Brand and Glasson (2004), Stuart and Thurlow (2000), Dilworth and Brown (2001), Johnson (2002), and Sleeter (1992) are illustrative of this consensus that has to do with beliefs about the existence and salience of

cultural diversity in education, and teachers' feelings of confidence in dealing with differences.

These studies indicate that many teachers believe the best way to deal with cultural, ethnic, and racial diversity is not to deal with it at all. The prevailing ideological preference is still claims of colorblindness, denial of widespread educational and societal inequalities, and the pre-eminence of de-contextualized individuality. Many prospective and practicing teachers equate explicitly acknowledging ethnic, racial, and cultural differences with a form of racism, or perceive it as divisive and contentious. Instead, they believe human similarity should be emphasized.

G. Howard (1999) elaborated on how beliefs in colorblindness operate. He observed from experiences working with white educators that their "declaration of colorblindness assumes that we can erase our racial categories, ignore differences, and thereby achieve an illusory state of sameness or equality. The colorblind perspective treats race as an irrelevant, invisible, and taboo topic . . . the proponents of colorblindness assume that the mere perception of difference is a problem" (p. 53).

Gay (2010a, 2010b), Marx (2006), Pollock (2004), Milner (2010), and Schofield (2010) made similar observations from their interactions as teacher educators and researchers with prospective and practicing teachers. For instance, Schofield cautioned,

Although the colorblind perspective is appealing because it is consistent with a long-standing American emphasis on the importance of the individual . . . it easily leads to a misrepresentation of reality in ways that allow and even encourage discrimination against minority group members. . . . In addition, it can foster a lack of recognition of problems that might be dealt with constructively if they were acknowledged. Furthermore, the colorblind perspective makes it unlikely that the opportunities inherent in a pluralistic institution will be fully realized and that the challenge facing such an institution of providing all of its students with an engaging and effective education will be met. (pp. 260; 276)

A second set of teachers' beliefs related to cultural diversity evoke uncertain confidence in its positive power and their own related capabilities (McIntyre, 1997; White, 2011; Gay 2010a). Many are not confident about their ability to deal appropriately with diversity in their classrooms; and they believe they can circumvent the tensions and controversies they are certain to provoke by either ignoring cultural and racial differences entirely, or by acknowledging their existence but denying their salience. They are afraid of making mistakes, insulting diverse peoples, and of being labeled racists. Hence, they claim to believe that race, culture, class, and ethnicity do not matter in the educational process. Many prospective and practicing teachers also seem to genuinely believe that teaching and learning are devoid of all cultural nuances, and they are baffled by contrary claims. In other words, many teachers simply do not believe in the existence of culture; or that they and their students are cultural beings, and as such, there may be some fundamental differences among them that affect teaching and learning.

Houser and Chevalier (1995) reported a third type of beliefs about ethnic, racial, and cultural diversity common among prospective and practicing teachers. This is the consistency of teachers' beliefs with idealized societal values such as equality,

positive benefits of cultural assimilation, receptivity to selected immigration, and the tendency to blame marginalized groups for their own social conditions. Thus, some teachers believe the achievement problems of students of color are their own and their families' fault and can be remedied through individual motivation, interest, and hard work, just as society claims every individual can succeed with the application of effort, ingenuity, and perseverance. The preservice teachers in a study conducted by Milner (2006), who were enrolled in a multicultural education course at the time, relied mostly on stereotypes about racial and ethnic groups that they learned from media and their families, or they had been taught not to see race at all. They accepted these taken-for-granted beliefs without giving any deep or critical thought to them, especially those related to not seeing race or recognizing differences. The inclusion of multicultural education in the learning experiences provided to teacher candidates was successful in developing racial consciousness and critical receptivity to teaching cultural diversity for these prospective teachers.

Pohan's (1996) study was both unusual and quite similar to other research on teachers' beliefs about cultural diversity. It, too, involved prospective teachers, but on a much larger scale, and the results were consistent with the prevailing trends. She reported a fourth common feature of teachers' beliefs—that is, a strong relationship between personal experiences with and professional beliefs about cultural diversity. The beliefs of the 492 teacher candidates included in her study were significantly related to their cross-cultural experiences. Teachers who had strong biases and negative stereotypes about diverse groups were less likely to develop professional beliefs and behaviors consistent with multicultural sensitivity and responsiveness than those who had positive or even ambivalent feelings. Furthermore, teachers who had multicultural life experiences tended to have more positive beliefs about and attitudes toward cultural diversity, but most teachers come from monocultural backgrounds, regardless of their ethnic and racial identities (Pohan, 1996; Causey, Thomas, & Armento, 2000).

In her qualitative study of 13 white undergraduate female student teachers, McIntyre (1997) shifted the axis of analysis by exploring how the participants perceived themselves, and their roles as teachers of culturally diverse students. She conducted an intervention exploring the meaning of white racial identity to break the silence that surrounds whiteness. As she explained, "This was not about liberating the marginalized but about prying open self-criticism among those who occupy the center in ways that would challenge us to think about what life is like on the margins and how we, as the center, could alter existing inequitable structures" (p. 23).

From the data collected McIntyre constructed a profile of what she called "white talk," and defined as ways of communicating about race-based issues in education (including whiteness) that whites use to deny the salience of racism, and insulate themselves, individually and collectively, from taking responsibility for perpetuating racism and inequities. McIntyre explained that this is "a kind of talk that doesn't just obliterate the lives of people of color. It also anesthetizes the white psyche, and serve to minimize white culpability for the existence of individual, institutional, and societal racism" (p. 78).

McIntyre's (1997) study is significant here because the "white talk" described was infested with pejorative beliefs about cultural diversity. They were present in both what the participants in the study said and how they talked about whites and people

of color. Both were characteristic of some common trends of how teachers engage in race-based discussions and their beliefs about cultural diversity. The talk tactics included “derailing the conversation, evading questions, dismissing counterarguments, withdrawing from the discussion, remaining silent, interrupting speakers and topics, and colluding with each other to create a ‘culture of niceness’” (McIntyre 1997, p. 46). Among the prominent beliefs that emerged were not being racist but afraid of being accused of such; equating the mere recognition of differences among ethnic and cultural groups/individuals with racism; declaring people of color should take more responsibility for self-marginalization and work harder to include themselves in the culture of mainstream society; whites wanting and needing to rescue less fortunate people of color; perceiving students of color as deficient; and considering white teachers sharing their own wealth of knowledge and experience as a viable approach to effectively teaching students of color.

Causey, Thomas, and Armento (2000) provided some helpful ways to categorize and conceptualize the attitudes and beliefs toward cultural diversity that prospective teachers have at entry into professional preparation programs. Undoubtedly, many practicing teachers have similar beliefs. They explained that many college students

enter teacher education programs believing strongly in an *optimistic individualism*—the inevitability of triumph over any obstacles through hard work and individual efforts . . . *absolute democracy* when it comes to students, that ‘kids are kids,’ regardless of their cultural background or that the same ‘good’ pedagogy is equally effective for all students . . . [and] attitudes of *naïve egalitarianism*. That is, they believe each person is created equal, should have access to equal resources, and should be treated equally. (Causey, Thomas, & Armento 2000, pp. 33–34, emphases in the original)

Ullucci (2007), Gomez (1993; 1996), Easter, Shultz, Neyhart, and Reck (1999), Marx (2006), Cochran-Smith (1995), Aaronsohn, Carter, and Howell (1995), and Schofield (2010) concurred with these assessments of beliefs about cultural diversity that are prominent among both prospective and practicing teachers.

At first glance the categories of beliefs offered by Causey, Thomas, and Armento (2000) may seem admirable and amenable to promoting cultural diversity. But they cautioned that these beliefs can cause teachers to “deny the privileges they may enjoy because of their skin color and social class, and to discount or minimize the effects of past and present discrimination” (p. 34) in U.S. schools and society. These caveats are particularly possible and problematic when beliefs such as colorblindness, optimistic individualism, and naïve egalitarianism, or facsimiles of them, are not critically interrogated and deconstructed. As Shultz, Neyhart, and Reck (1996) and Cochran-Smith (1995) explained, unexplored teachers’ beliefs about cultural diversity also can perpetuate racial stereotypes, cultural hegemony, and ineffective teaching and learning experiences for marginalized and underachieving students of color. Other research, such as that conducted by White (2011), indicates that prospective teachers do not deeply scrutinize their beliefs and assumptions about ethnic, racial, and cultural diversity. To do so would first require admitting that cultural diversity is real, and recognizing its salience and complexities.

IMPORTANCE OF TEACHER BELIEFS ABOUT CULTURAL DIVERSITY

According to Richardson (2003), Raths and McAninch (2003), Guerra and Nelson (2009), and Ullucci (2007), there is considerable agreement among educators on the significance of teachers' beliefs. This consensus includes effects of teachers' attitudes and beliefs on their own teaching and students' learning behaviors. Richardson argued that beliefs affect behaviors but it is debatable whether they are antecedent, derivative, or dialectically intertwined. Ullucci (2007) suggested that teachers' beliefs about cultural diversity matter in consequential ways for the educational opportunities that ethnically, racially, socially, and linguistically diverse students receive. She elaborated further that

Teacher beliefs form the foundation of the child/educator relationship. The expectations teachers have, their beliefs about the educability of children and their personal racism, overt or covert, impact their interactions with students. Unfortunately, an array of research on teacher beliefs provides us with two doses of bad news. First, teachers—in particular White teachers—often have negative beliefs about children of color. Secondly, these beliefs matter. School practices and policies *are shaped by* the conceptions teachers and administrators have about the children in their care. If these stakeholders harbor limiting beliefs, these beliefs will be reflected in the programs and policies they create. (n.p., emphases in the original)

Pohan (1996) delivered the same message more tersely, but nonetheless unequivocally in stating, “differential expectations lead to differential treatment, which result in differential student outcomes” (p. 65), and teachers' expectations stem from their beliefs.

The fact that teachers' beliefs about cultural diversity are complex, often contentious, sometimes conflicted, and always significant in teaching is uncontested (Raths & McAninch, 2003). These dynamics and complexities are exacerbated in the context of educating ethnically, racially, economically, and linguistically diverse students. For instance, the beliefs some teachers have about different kinds of cultural diversity may be fluid and dynamic, and even appear to be inconsistent or contradictory; for others, their beliefs are inflexible and constant, to the point of being recalcitrant. This multiplicity of beliefs within individuals and among groups of teachers, and even about what appears to be common concerns, complicates the task of addressing them appropriately and effectively in research, teacher preparation, and instructional practices. Thus, the nature of beliefs, in itself, attests to their significance. But, there are many other reasons for their importance as well.

Research is not definitive on where or how teachers acquire their beliefs about cultural diversity, especially those they hold at entry into initial professional preparation programs. Some researchers attribute the source to family socialization, others credit prior educational experiences, and still others suggest that teachers' beliefs are cultivated by and reflect mainstream U.S. society (Raths & McAninch, 2003; G. Howard, 1999; Ullucci, 2007; Marx, 2006). However, research findings consistently reveal that many of these beliefs are formed early in life, and are often negative,

prejudicial, and otherwise problematic for teaching culturally diverse students more effectively. Undoubtedly, teachers, like everyone else, are immersed in racial, ethnic, and social class biases by simply living in U.S. society, and these are part of the “funds of knowledge” they bring into the profession. This socialization occurs long before they begin preparing to become teachers, and the effects often prevail thereafter. The beliefs about cultural differences that teachers bring to their teaching practices act as filters of new knowledge and counter ideologies (Fives & Buehl, 2012).

Raths and McAninch (2003), Nieto (2004), and Kottler (1997) made some compelling observations that support these contentions. Raths and McAninch suggested that “There is no reason to believe that entrants into teaching would be any more egalitarian in their beliefs regarding race, class, gender, and disability than the citizens in the communities in which they teach, yet they are called upon to implement . . . policies safeguarding the civil rights of students” (p. viii). Nieto’s (2004) perceptions are virtually identical to those of Raths and McAninch. She stated that “it is no surprise that some teachers have negative perceptions, biases, and racist attitudes about the students they teach . . . [since they] pick up the same messages and misconceptions that we all do, and it is only by confronting the ones that get in the way of student learning that change will occur” (p. 217). Kottler (1997) offered a similar but more graphic explanation. He contended that although teachers may publicly avow or pretend otherwise,

Within the privacy of our own minds . . . each of us harbors both racist and culturally biased attitudes. Because we are not allowed to admit these negative feelings, much less talk about them in an open forum, they remain underground and unchallenged. We go about our business refusing to acknowledge, much less confront, the stereotypical images we have of people who belong to other cultural groups. Those who claim to be most enlightened are adamant that they are exempt from these labels. In some ways, such teachers are almost as dangerous as publicly espoused racists because, without acknowledging subtle and unintentional biases, little can be done to change them. (pp. 57–58)

In explaining further about how teachers position themselves ideologically on cultural diversity, Kottler (1997) declared that

each of us holds biases in favor of some students and against others. Whereas some students earn our wrath, others inherit our feelings based on attitudes we hold toward their particular gender and culture. We can deny this all we like—claim to be exempt from such prejudices, point fingers elsewhere, make excuses, and disavow responsibility—but the fact remains that every teacher on this planet has strong preferences toward students he or she would prefer to teach. Some of these preferences are based on individual characteristics; others are based on skin color, physical attributes, and cultural patterns. (pp. 170–171)

Kottler’s candor is supported by research that indicates most prospective teachers aspire to teach in communities like the ones of their childhood, and in schools similar to the ones they attended (Zeichner, Melnick, & Gomez, 1996; Van Hook, 2002; Loeb, Boyd, Lankford, & Wyckoff, 2005; Ullucci, 2007). Given who teachers

are demographically, these aspirations are not about teaching in poor, racially and culturally diverse schools and communities. The inconsistencies between the aspirations and the realities of employment possibilities are problematic to say the least, and they attest to the importance of scrutinizing the origins and manifestations of teachers' beliefs about cultural diversity in both explicit and subtle or implied forms.

Other researchers added another factor that underscores the importance of teachers' beliefs about cultural diversity. This is their resistance to change. For example, in their review of research on teacher preparation for cultural diversity Dilworth and Brown (2001) noted that,

virtually all authors speak to the rigidity of neophyte teacher beliefs and attitudes. These premises include the inability or difficulty in unpacking prior understandings, conceptualizing new paradigms, and trusting that there is merit in diversity. . . . [T]hese fixed notions appear universally among [teacher education] students as well as seasoned practitioners and are not restricted by age, race, ethnicity, language, or regionality. (p. 659)

Societal and personal socialization influences may explain why certain beliefs about ethnic, racial, and cultural diversity persist among teachers, and are so difficult to change. However good initiatives are to dispel teachers' negative or ambivalent perceptions, distortions, misconceptions, and inaccuracies about ethnic, racial, and cultural diversity, they may not be strong enough to counter the sustaining influences of society. If discriminatory ideologies and actions are so pervasive in society that they are normative (as critical race theorists contend) then counter narratives in teacher education that argue the contrary may be considered untrue. Such thoughts may not even be consciously constructed. Teachers may have good intentions to cultivate positive beliefs about cultural diversity but they do not prevail under demands of introspection, the stress of change, the power of the status quo, and the sanctions of peers and colleagues, all of which are frequently provoked by the introduction of cultural diversity into educational discourses and actions. In the face of these conflicting narratives, some teachers soon revert to or re-affirm their normative notions of cultural diversity that tend to reflect those of mainstream society.

Many advocates of cultural diversity involved in teacher education tell similar stories about how this process unfolds. At the beginning of studying cultural diversity most prospective and practicing teachers seem to be receptive, or at least tolerant, of broad, general ideas about and emphases on awareness, sensitivity, and appreciation of cultural differences. As more specific features and demands of diversity (such as inequities imposed on particular ethnic group; race and racism; white power and privilege; empowerment of the under-privileged; and systemic change) are introduced reluctance, resistance, and opposition begin to surface (Gay, 2010b; T. Howard, 2010; S. Lee, 2005). Scott (1995) called awareness of cultural diversity its humanistic aspect and observed that teachers usually exhibit little resistance to it. However, he found resistance increased as attention focused more on issues of empowerment for the disenfranchised. This resistance includes pleading powerlessness and incompetence to effect systemic change, lack of time for teaching cultural diversity, disavowing any personal responsibility for oppression and inequalities, and claiming that some issues are too volatile to be viable for classroom teaching.

These reactions, or what Trent, Kea and Oh (2008, p. 6) called “distancing strategies,” increase in intensity and magnitude the closer dealing with diversity comes to engaging in deliberate and explicit actions to change the fundamental structures of U.S. society and schools. Rather than accept and endorse the transformative action features of cultural diversity, teachers (even those who begin with declarations of “good intentions to respect differences”) retreat to the comfort of the status quo, with statements like, “differences are fine, but these people are living in the United States and they need to fit into society.” The implicit message here is, “While some tangential, occasional, or minor differences are tolerable (and even desirable), things that are really significant must be congruent with mainstream societal norms.” The question, then, is how can genuine progress be made in changing teachers’ beliefs about cultural diversity when the environmental contexts in which they live and function, professionally and personally, continue to be counterproductive?

In her study of experienced teachers, Gallavan (1998) provided other reasons for resistance to the inclusion of cultural diversity that have to do more with the professional contexts of teaching than personal beliefs. The study participants included 113 teachers (95 of whom were middle class European Americans), with an average of six years professional experience. It was undertaken to determine why teachers do not use effective multicultural education practices in their classrooms. Some of this ineffectiveness was attributed to resistant beliefs. These included teachers believing that they were already using effective multicultural practices and were resistant to changing what was working well; multicultural education puts too much emphasis on racial differences, race relations, and other controversial issues; their other professional competence and status are threatened by cultural diversity; and their classrooms are not multicultural and therefore teaching cultural diversity is irrelevant. Gallavan also found that the teachers of color in the study lacked an adequate understanding of cultural diversity and were resistant to it, but for different reasons. They believed that their ethnic and racial identities privileged them in these endeavors and there was no need for further study. In other words, “These individuals claim that their personal lives have provided them with enough empirical evidence to be multiculturally astute and are more attentive to multicultural education concerns than their white counterparts” (Gallavan 1998, p. 23). Research findings such as these suggest that teachers have both generalized and particularistic resistances to cultural diversity, based on beliefs about the extent of their prior personal encounters, the quality of their perceived professional competences, and the relevance of cultural differences to teaching and learning.

Probably the most salient reason why teachers’ beliefs about cultural diversity are important is because they affect the instructional and relational behaviors of teachers toward ethnically and racially different students. Some beliefs have deleterious effects on the learning opportunities and outcomes of some students while others have facilitative effects. In other words, teachers’ beliefs are a significant variable in achieving educational equity and closing the achievement gaps for underachieving students of color and poverty. They may be both a partial cause and solution to this persistent challenge.

Beliefs about cultural diversity signal moral and value commitments, and often are self-fulfilling prophecies. Kaufman (2012) defined self-fulfilling prophecies as beliefs that come true because individuals act as if they are already true. Thus, if

teachers believe cultural diversity will be contentious in classroom instruction, it will be. If they believe it is fundamental and significant, they will make it so, and their students will follow suit. Teachers get from students what they expect based on what they believe is true. This places teachers in the position of being power brokers and pacesetters about whether or how cultural diversity will be addressed in classrooms.

IMPLICATIONS FOR FUTURE PRACTICE AND RESEARCH

Teachers' beliefs need to be examined more thoroughly and comprehensively in research, teacher preparation, and classroom instructional practices. Although often conflicted and contested, beliefs about cultural diversity affect the perceptions and expectations teachers have for diverse students, and these, in turn, influence their personal and pedagogical behaviors in classrooms. Therefore, more detailed information is needed about how beliefs about various dimensions of cultural diversity are crafted and conveyed in both thought and action, as well how teaching beliefs and behaviors correlate in actual classroom settings. These examinations should include, minimally, recognizing and naming beliefs about cultural diversity; determining how both affect the quality of learning opportunities and outcomes for whom; and developing positive beliefs about cultural diversity.

Several authors have suggested some useful strategies for how to accomplish these understandings and skills related to beliefs about cultural diversity. For example, Garmon (2005) identified six factors for consideration by teachers in studying their own beliefs, and grouped them into two categories. First, dispositional factors include developing openness or receptivity to diversity, self-reflectivity, and a strong sense of social justice and equity. Second, experiential factors that facilitate attitudinal changes toward diversity encompass general intercultural or multicultural encounters; direct interactions with specific ethnic, racial, and cultural individuals and communities; support groups; and structured learning experiences. Gay (2010a) proposed a series of reflective questions to assist teachers in developing critical consciousness about beliefs related to cultural diversity. They include identifying how different beliefs are embedded and manifested in instructional behaviors; being able and willing to expose beliefs to critical analysis; and considering the validity and viability of alternative beliefs that are more supportive of the positive benefits of cultural diversity. She also suggested that these analyses should be accompanied by supervised opportunities to convert new beliefs into practices for both classroom teachers and teacher educators. Milner (2006) developed a list of critically reflective questions as well but his focus on teachers understanding how their own and their students' race affects their instructional thinking, beliefs, and actions. Guerra and Nelson (2009) proposed a learning sequence for examining teachers' beliefs that begins with teacher educators taking inventory of their own beliefs about diversity, and their competence and commitment to assist others in analyzing and changing theirs. Other parts of the process include assessing and cultivating readiness for examining beliefs and related behaviors; challenging and reframing existing beliefs; and rethinking attitudes and practices considered colorblind.

Another area that needs further study is deciphering specific aspects of teachers' beliefs about cultural diversity instead of continuing to treat them as if they were

monolithic. Undoubtedly, teachers' beliefs are multidimensional and multi-layered (see Schraw & Olafson, Chapter 6, this volume), as is cultural diversity, and some aspects of them for different teachers are probably more problematic or facilitative than others. Research and teaching that identify and characterize these differences will be much more valuable for developing programs and learning strategies to help teachers critique and change beliefs that are prohibitive to promoting cultural diversity.

Heeding the advice of Murrell and Foster (2003) that teacher dispositions demand attention in research and scholarship about cultural diversity, some of the current emphasis on beliefs could be complemented by inverting the analyses—that is, examining culturally diverse instructional practices first and then extrapolating beliefs from them, rather than predicting behaviors from beliefs. Some of this is already being done by studying how multicultural teacher education courses affect attitudes and beliefs about cultural diversity, but much more is needed. For example, many of the current findings are based on self-reports of participants in teacher education programs and the observations of their instructors, but it is not always clear how they arrived systematically at their profiles. Also, classroom practices discussed are speculative and anticipatory rather than being analyses of actual teaching in K-12 and teacher education classrooms. Therefore, descriptions of the components of paradigms, templates, and rubrics used in research and practice to compile and characterize teachers' beliefs about cultural diversity need to be specified, and the teaching targeted for study should occur in diverse classroom settings.

Much more research, scholarship, and practice also are needed about how teachers' beliefs, and related actions are differentiated by a variety of contextual influences and demographic variables. For example, there are some indications from previous research and logic that suggest teachers with multicultural life experiences have more positive beliefs about cultural diversity. Consequently, it will be helpful to know more about how the beliefs of teachers from different social and experiential backgrounds compare. Other variables that may affect teachers' beliefs that need careful examination are years of professional experience, gender, the disciplinary emphases of their academic careers, race, ethnicity, gender, and school level of teaching.

Certainly, more research is needed on the cultural diversity beliefs and related instructional behaviors of teachers of color from different ethnic groups, including African, Asian, Latino, and Native Americans toward students of diverse groups. Another growing population among teachers that needs to be included in future studies is first- and second-generation immigrants from different ethnic, cultural, and national backgrounds. In some school districts this population is significant, and may have beliefs about cultural diversity quite different from teachers of ethnic groups who have been in the United States much longer. It is also likely that different heritage immigrants and teachers of color will have different beliefs about ethnic, racial, cultural, and social groups in U.S. society and schools.

Furthermore, research needs to collect and disaggregate data on teachers' beliefs about cultural diversity according to specific groups of students. It is highly probable that the generalized beliefs teachers have about cultural diversity are not equally applicable to all specific ethnic, racial, gender, and linguistic groups. Without knowing how these vary among groups, statements about teachers' beliefs may be skewed, distorted, and misleading. Conversely, information on teachers' beliefs about specific

groups within the broad category of “ethnic, racial, and cultural diversity” can expedite locating particular needs, and designing and implementing more appropriate instructional interventions.

CONCLUSION

While research on teachers’ beliefs about cultural diversity is not unequivocal, it is compelling. Whether positive, negative, or ambiguous, deliberate or unintentional, implicit or explicit, some kinds of beliefs and assumptions about ethnic, racial, and cultural differences are always embedded in instructional practices. Too often these beliefs are not reasonable foundations for effective instructional practices for culturally diverse students. These beliefs do not have to be explicated to be profound; in fact they often are not. Their ubiquitous and pervasive nature is another testament to their significance. There also is a high level of congruency between the beliefs teachers hold about cultural diversity and those prevalent in society at large, and these beliefs are highly resistant to change. A frightening possibility is that as the ethnic, racial, and cultural divide between students and teachers increases so will beliefs that convey negativism, confusion, denial, avoidance, and resistance toward cultural diversity. Whether driven by intentions and claims “To do no harm” to diverse students by avoiding controversial issues or outright opposition to cultural diversity, the harm is done because these beliefs generate teaching behaviors that are not conducive to equitable access to education for culturally, ethnically, and racially diverse students.

As educators pursue reform efforts to achieve equity and excellence for students from different ethnic, racial, social class, and linguistic backgrounds, teachers’ beliefs about cultural diversity should be primary targets of scrutiny and transformation. Certainly all teachers have some kind of beliefs about cultural diversity; and undoubtedly they are complex, confounding, and sometimes even daunting. While these beliefs may not always be clearly understood or articulated, they are consequential to how teachers function in pluralistic classrooms. As Guerra and Nelson (2009, p. 355) suggested (and other researchers and scholars agree), “Educators must address underlying beliefs if we hope to significantly improve learning for culturally, linguistically, and economically diverse students.” Indeed, teachers’ beliefs may be the next chapter in the continuing saga of closing the achievement gaps in U.S. public schools. Easter, Shultz, Neyhart, and Reck (1999) were much more emphatic about this possibility in declaring that “by changing the beliefs of tomorrow’s teachers, the American education system will take the greatest stride toward meaningful reform in a culturally diverse society” (p. 218). One addition to this prediction is worthy of note—examining the beliefs of tomorrow’s teachers must include those preparing to become and those who are already in the profession, as well as those who are the designers and facilitators of teacher education programs. Without concerted and comprehensive efforts in multiple locations of the education profession, little progress of the magnitude needed to cultivate instructional beliefs and behaviors that endorse cultural diversity unequivocally is likely to occur. The involvement of both prospective and practicing teachers, along with teacher educators and supervisors, is paramount to these endeavors.

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26

TEACHERS' BELIEFS ABOUT ENGLISH LANGUAGE LEARNERS

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Increased migration resulting from globalization has helped transform the linguistic makeup of the P-12 student population in the United States and elsewhere over the past two decades (Ben-Peretz, 2009). In 2008, for example, an estimated 10.9 million children in the United States spoke a language other than English at home, up from 2.5 million in 1990, an astonishing 330% growth (U.S. Department of Commerce, 2010). In fact, English language learners (ELLs), as these children are often called, have become the fastest growing segment of the U.S. student population (Calderon, Slavin, & Sanchez, 2011). Until recently, the goal was to place these students in bilingual or English as a second language (ESL) programs to be taught by teachers with specialized preparation. However, since the passage of the No Child Left Behind (NCLB) Act of 2001, which requires ELLs to be included in state testing programs and their scores reported to the public, schools have been placing a growing number of these students in mainstream classrooms to immerse them in English as soon as possible. As a result, mainstream or general education teachers, a group that traditionally has received little or no preparation for teaching ELLs, are now finding ELLs in their classes with increasing frequency. It is not surprising then that preservice and inservice programs are giving more attention to preparing general education teachers for teaching ELLs (Lucas, 2011). Nor is it surprising, given the critical role teacher beliefs play in teaching, that research on teachers' beliefs about ELLs has emerged in the past 15 years.

Perhaps the most compelling reason to study teacher beliefs about ELLs is that teachers' perceptions and judgments of students' ability to learn are filtered through their beliefs, often resulting in negative consequences for learners who are different from the assumed mainstream norm (Brophy & Good, 1986; Fives & Buehl, 2012). A substantial body of research dating back to the 1960s shows that teachers hold disparate expectations for students based on social class, race, and ethnicity (van den

Bergh, Denessen, Honrstra, Voeten, & Holland, 2010). They tend to emphasize what students from less powerful economic, racial, and ethnic groups do not know and cannot do, resulting in low expectations for student learning. Once formed, those expectancy beliefs lead teachers to treat students in ways that stifle their learning and ultimately produce self-fulfilling prophecies (Rosenthal & Jacobsen, 1968). Because ELLs differ from the English-speaking student norm in U.S. schools and most are also from low-status racial and/or ethnic groups (Aud, Fox, & KewalRamani, 2010), they may be the recipient of negative teacher beliefs, particularly in the current anti-immigrant climate in the United States and other countries.

There is considerable agreement among scholars regarding what teachers need to know and be able to do to successfully teach ELLs (e.g., Gándara, Maxwell-Jolly, & Driscoll, 2005; Lucas & Villegas, 2011; Lucas, Villegas, & Freedson-Gonzalez, 2008; Valdés, Bunch, Snow, & Lee, 2005; Wong-Fillmore & Snow, 2005). A full discussion of this literature is beyond the scope of this chapter, but we will highlight elements of knowledge, skills, and dispositions for teaching ELLs that have special relevance for teachers' beliefs. Some of these elements are well-understood in the general literature on teaching and teacher preparation—e.g., teachers must believe that all children can learn, caring teachers should actively nurture all students' abilities and potential, and teachers need to be reflective and willing to challenge their own attitudes, assumptions, and beliefs (Darling-Hammond & Bransford, 2005; Nieto, 2000; Villegas & Lucas, 2002).

Other aspects of the education of ELLs relevant to teacher beliefs are more specific to teaching ELLs in particular. One of these is that teachers need to value students' home languages and cultures and convey that value to the students (Lucas & Grinberg, 2008). Another is that teachers must understand that language, culture, and identity are closely related, and that sociopolitical factors influence perceptions, uses, and learning of language (Lucas & Villegas, 2011). Third, teachers need to understand how people learn a second language. Some established principles of SLA are: (a) skills and concepts learned in the first language (L1) transfer to the second language (L2; Cummins, 2000; Thomas & Collier, 2002), thus rendering L1 development a resource rather than an obstacle to SLA inside and outside school; (b) learning a second language requires direct, frequent, and authentic interactions with people who are fluent in that language, even for learners with minimal L2 proficiency (Gass, 1997; Wong-Fillmore & Snow, 2005); (c) developing academic proficiency in a second language comparable to one's peers takes five to ten years regardless of the time spent in classrooms studying the language (Cummins, 2000); and (d) conversational language proficiency is fundamentally different from academic language proficiency (Cummins, 2000), thus making it essential for teachers to consider the multifaceted L2 abilities of learners to avoid making erroneous assumptions, for example, about their literacy skills based on their oral fluency. Each of these principles is susceptible to misconception (McKeon & Samway, 2007).

Teachers need to critically inspect their beliefs in light of current thinking in the profession to identify beliefs they hold that conflict with the above foundations for teaching ELLs. Without such critical reflection, teachers' effectiveness with ELLs may be compromised, as they may misconstrue student behavior and language use to make them fit into their network of beliefs or dismiss those ideas altogether (Pajares, 1992; Richardson, 1996).

Given the influence teachers' beliefs exert on the success in school and future life chances of all students, especially students from marginalized groups, and the growing presence of ELLs in U.S. schools, teachers' beliefs about ELLs demand serious scrutiny. In this chapter, we examine the empirical literature on general education teachers' beliefs about ELLs. The chapter is organized into three sections: (1) review methods; (2) results of our analysis; and (3) a concluding discussion that summarizes key findings, identifies gaps and methodological issues in the research, makes recommendations for future research, and identifies implications for teacher preparation and professional development.

REVIEW METHODS

In this chapter, we use *English language learners* to refer to those students who speak native languages other than English. While ELLs are at different levels of proficiency in English, we are most concerned with those who have not yet developed the degree of proficiency in academic English expected of students at their grade level (sometimes referred to as limited English proficient [LEP] or bilingual students). As difficult as it is to precisely describe this student group, it is even more challenging to settle on a clear definition of *belief* as the concept is used in the empirical literature. To ensure that our review was comprehensive, we included studies that use the various "aliases" for beliefs identified by Pajares (1992), such as *attitudes, judgments, conceptions, preconceptions, perceptions, dispositions, views, and perspectives*—constructs that require a person's judgment regarding "the truth or falsity of a proposition" (Pajares, 1992, p. 316).

To identify the literature, we conducted computerized searches of major databases, including EBSCO Academic Premier, PsycLIT, PsycINFO, PsycARTICLE, and Science Direct. Search terms used in various combinations included *teacher(s); belief(s)* and the list of "aliases" for *beliefs* offered by Pajares (1992, p. 309); *English language learner(s), ELLs, limited English proficient, LEP, bilingual, ESL, and language minority student(s)*. We placed no limit on the time frame of publication, and we included research on both preservice and inservice teachers. We focused on the beliefs of general education teachers, but also included research in which ESL and/or bilingual teachers were studied along with mainstream teachers. We sought studies published in peer-reviewed venues (journals, books) or papers prepared for peer-reviewed conferences. This process yielded an initial list of 95 studies. Works in this list were then excluded if they were not focused on ELLs in P-12 schools or were not published in English, if they focused on teachers of ELLs outside the United States, or if they provided insufficient information about research methods or applied methods we deemed inappropriate. At the end of this process, we were left with 37 studies (see Appendix [Table 26.1]).

The analysis was conducted in three stages. We first summarized the articles using a template to capture key information (e.g., theoretical/conceptual framework(s), research purpose and methods, sample, major findings). We then coded the summary notes with both open and predetermined codes, the latter derived from the literature reviewed in the first phase of analysis (Strauss & Corbin, 1990). Finally, we read the article notes multiple times until we had accounted for all the substantive issues related to teachers' beliefs about ELLs and derived themes that emerged from the studies.

RESULTS

We now turn to the results of our analysis, organized according to three themes—the content of teachers’ beliefs about the teaching of ELLs, variables related to teachers’ beliefs, and the relationship between teachers’ beliefs and their practices. While a few studies also examined changes in teachers’ beliefs, the findings were not sufficiently robust to support change in beliefs as a theme in this review. Methodologically, slightly less than one-half ($n = 18$) of the studies used only quantitative surveys or inventories; nine others used mixed-methods designs; and the remaining 10 used qualitative designs. A discussion of the three themes follows.

What Teachers Believe Regarding the Teaching of ELLs

What teachers¹ believe was a prominent theme in the literature, evident in 30 studies. Analysis of this work revealed five types of beliefs, as shown in Table 26.1 (see Appendix).

Teachers’ preparedness for teaching ELLs. In 9 of the 11 studies in this strand, teachers reported feeling inadequately prepared to teach ELLs (Cho & Christenbury, 2000; Escamilla, 2006; Karabenick & Noda, 2004; O’Neal, Ringler, & Rodriguez, 2008; Penfield, 1987; Polat, 2010; Reeves, 2006; Rodriguez, Manner, & Darcy, 2010; Walker, Shafer, & Iams, 2004). For example, a survey administered by Rodriguez et al. (2010) to 11 inservice teachers taking a distance education course on teaching ELLs in North Carolina revealed that respondents believed their preparation programs had given them neither a solid theoretical foundation nor sufficient experiences with ELLs to address their needs in the classrooms. Similarly, Polat (2010) found that the 83 inservice and 88 preservice teachers who responded to three belief questionnaires exploring their readiness and self-competency for teaching ELLs reported feeling unprepared to teach this student population. Curiously, while Reeves (2006) and Walker et al. (2004) also found that the 279 and 422 teachers they surveyed, respectively, felt inadequately prepared to teach ELLs, relatively few of those teachers indicated an interest in participating in professional development to improve their pedagogical skills in this area.

Findings of 2 other studies in this set of 11 offered a somewhat less pessimistic perspective regarding teachers’ sense of preparedness for teaching ELLs. Graduates of one teacher education program indicated feeling “moderately well prepared” for teaching linguistically diverse students (Coady, Harper, & de Jong, 2011, p. 230). However, confidence in this finding is compromised by the low response rate (85/1200, 7%). Marx (2002) found that nine white female preservice teachers who tutored ELL students for one semester believed they needed no special skills or preparation. According to Marx, these teacher candidates felt “their kindness, their ‘good’ upbringings, and their willingness to tutor children commonly perceived to be ‘at risk’ were qualifications enough” (p. 6). The researcher concluded, however, that the teachers’ belief was not well founded.

The challenges teachers face in teaching ELLs. Six studies examined teachers’ beliefs regarding the challenges of teaching ELLs in mainstream classes (Batt, 2008; Cho & Christenbury, 2009; Cho & Reich, 2008; Gándara, Maxwell-Jolly, & Driscoll, 2005; O’Brien, 2009; Reeves, 2006). The largest of these, a frequently cited survey of

5,300 educators (4,000 of them working in mainstream classrooms) in 22 California school districts (Gándara et al., 2005), identified four major challenges: communication with students and their families, insufficient time to teach ELLs the required language skills and content, the wide range of English and academic abilities among ELLs within each class, and lack of tools (e.g., textbooks, assessments, other materials). Three of these challenges were echoed by teachers in the other five studies in this set: lack of time to adequately address ELLs' learning needs (Batt, 2008; Cho & Christenbury, 2009; Reeves, 2006); lack of appropriate materials (Cho & Reich, 2008); and difficulty communicating with students and/or their families (Cho & Christenbury, 2009; O'Brien, 2009). An insufficient number of qualified staff, such as bilingual and ESL teachers, was another challenge identified in one study (Batt, 2008).

ELLs' academic ability and potential. Seven of the nine studies in this strand found that teachers held largely negative beliefs about ELLs' academic ability and potential. In Penfield's (1987) pioneering investigation, 162 New Jersey teachers responding to an open-ended survey expressed negative stereotypes about ELLs, especially Hispanic students, describing them as lazy, unwilling to put forth effort, and lacking value for education. A more recent survey examining attitudes toward ELLs among 422 K-12 teachers in North Dakota (Walker et al., 2004) revealed negative or neutral attitudes about ELLs' academic performance. Five other studies found that teachers held deficit perspectives of ELLs' academic abilities, focusing on their linguistic weaknesses instead of viewing their home language proficiency and emerging bilingualism as resources for learning (Escamilla, 2006; Hernandez, 2001; Johnson, 2000; Lee, Luykx, Buxton, & Shaver, 2007; Rodriguez et al., 2010). For example, Escamilla's (2006) year-long study showed that teachers tended to focus on what ELLs did not do well in their writing. Believing that the problems were the result of interference from Spanish, the teachers constructed what they perceived to be the students' writing deficits as "bi-illiteracy."

In contrast to these largely deficit views, two other studies found that teachers held favorable beliefs about ELLs and their school potential. The 18 English teachers in the Cho and Christenbury (2009) study commented that ELLs worked hard and were persistent in pursuing their education. Similarly, in her three-year ethnographic study following three ELLs from high school to community college, Harklau (2000) found that, while in high school, the students were largely perceived by their teachers as "hardworking, highly motivated students who had triumphed over adversity," who performed well and had a great deal of "drive and desire" to succeed (p. 46).

The inclusion of ELLs in general education classes. Five studies examined teachers' beliefs about including ELLs in general education classes. Four of these suggest that teachers are more supportive of the general idea of ELL inclusion than they are of having ELLs in their own classes (Karabenick & Noda, 2004; Penfield, 1987; Reeves, 2006; Youngs & Youngs, 2001). Work by Reeves (2006) exemplifies these findings. This study of 279 high school teachers' attitudes toward ELLs found that teachers were positive and welcoming toward inclusion in general, but were less positive about teaching ELLs who did not have a minimum level of English proficiency. The teachers believed that they lacked the time to address ELL needs in the mainstream classroom and that inclusion of ELLs did not benefit all students. Respondents in the study by Youngs and Youngs (2001) expressed mostly neutral attitudes about having

ELLs in their classes; they were slightly more positive when asked about their attitudes toward ELLs in general. The final study in this set (Walker et al., 2004) found that teachers held “neutral to strongly negative” attitudes toward ELLs (p. 138); 70% of respondents were “not actively interested” in having ELLs in their classes and another 14% “directly objected” to such placement (p. 140).

ELLs’ language learning in schools. Thirteen studies examined teachers’ beliefs about the use of students’ L1s in instruction or about the process of SLA. Findings of the eight studies that explored the use of L1 in instruction suggest that many teachers value linguistic diversity in general, but those beliefs do not necessarily carry over into practice (Garcia-Nevarez, Stafford, & Arias, 2005; Griego-Jones, 2002; Karabenick & Noda, 2004; Karathanos, 2009; Lee, Luykx, Buxton, & Shaver, 2007; Lee & Oxelson, 2006; Siwatu, 2007; Walker et al., 2004). For example, Karathanos (2009) found that 327 preservice and inservice teachers surveyed in Kansas were more open to the theory that supports the use of L1 in instruction than they were to its application in the classroom.

Six studies explored teachers’ beliefs about second language learning. Only one of these, conducted in California in the mid-1990s, revealed beliefs consistent with the scholarly literature about SLA. Shin and Krashen’s (1996) survey of 794 K-12 teachers in six California districts found “support for the principles underlying” the role of L1 in SLA (p. 51). Seventy percent of the teachers believed that ELLs understood content better when it was taught in L1, and 74% believed that literacy in L1 supports literacy development in a second language. The other five studies reported that teachers had inaccurate or uncertain beliefs about SLA (Escamilla, 2006; Griego-Jones, 2002; Karabenick & Noda, 2004; Reeves, 2006; Zainuddin & Moore, 2004). For example, the majority of teachers surveyed by Karabenick and Noda (2004) and Griego-Jones (2002) believed ELLs should speak English at home, contrary to research showing this practice as detrimental because it prevents development of bilingual skills and limits communication between parents and children (Wong-Fillmore, 1991). Seventy-two percent of the teachers surveyed by Reeves (2006) believed that ELLs should learn English within two years of entering U.S. schools, contrary to evidence that it takes five to ten years for ELLs to become comparably proficient to their English-speaking peers (Cummins, 2000).

Variables Related to Teachers’ Beliefs About ELLs

As Table 26.1 shows, 20 studies examined variables that were associated with teachers’ beliefs about ELLs—the second theme in our review. Four such variables surfaced from our analysis of this set of studies. This research does not establish causal relationships, but it does suggest some associations that warrant further study and, in some cases, recommendations for teacher educators.

Experience with diversity and/or ELLs inside and outside school. The strongest and most consistent pattern emerging from this set of 20 studies is that the more experience teachers have had with ELLs, or with linguistic diversity more broadly, the more positive are their beliefs about ELLs. Six survey studies (Byrnes, Kiger, & Manning, 1997; Flores & Smith, 2008; Karabenick & Noda, 2004; Polat, 2010; Shin & Krashen, 1996; Walker-Dalhouse, Sanders, & Dalhouse, 2009), and one interview

study (Zainuddin & Moore, 2004) showed that preservice and inservice teachers with more exposure to language minority populations or ELLs had more favorable attitudes toward them. For instance, Karabenick and Noda (2004) found that the amount of contact with ELLs reported by 729 teachers in a Michigan school district was significantly linked to positive attitudes (i.e., welcoming ELLs into their classrooms) toward ELLs; this association was stronger for teachers who had more ELLs in their classes at the time they completed the survey.

More general exposure to diversity was similarly associated with positive attitudes toward ELLs (Marx, 2000; Polat, 2010; Youngs & Youngs, 2001). A study of 143 secondary school teachers by Youngs and Youngs (2001) examined the role of six variables reported in the literature to be predictors of teachers' attitudes toward ELLs: subject area taught (social sciences, humanities, and natural sciences), multicultural course work (including foreign language courses), ESL training, personal experience with foreign cultures, contact with ESL students, and gender. The researchers found that while individually these variables were relatively weak predictors of teachers' attitudes toward ELLs, "collectively. . . [they] explain[ed] a significant and substantial 26% of the variance in teachers' attitudes" (p. 115). Thus, the more exposure teachers have to cultural diversity, the more favorable their attitudes toward ELLs are likely to be.

Teacher preparation and other educational experiences. As one might expect, formal preparation for teaching ELLs is strongly associated with teachers' beliefs about these students and their education, as evident in ten studies. In comparing beliefs and attitudes of mainstream teachers with those of teachers with ESL and/or bilingual credentials, four studies reported significant differences among these groups. Teachers with ELL-related credentials expressed more favorable attitudes toward heritage language maintenance (Lee & Oxelson, 2006), toward using L1 in instruction (Garcia-Nevarez et al., 2005), toward bilingual education (Shin & Krashen, 1996), and toward their ability to teach ELLs (Gándara et al., 2005), compared to teachers without such credentials. These studies do not establish whether these teachers sought ELL-related credentials because they were positively disposed to ELLs, or they developed positive attitudes by participating in the credential programs. Teachers with some professional development or coursework in teaching ELLs, but without formal credentials, also have more welcoming, positive attitudes than those with no preparation at all (Byrnes et al., 1997; Walker et al., 2004; Youngs & Youngs, 2001). Walker and her colleagues concluded that "even a little appropriate training can go a long way in preventing and improving negative teacher attitudes" (p. 142). Similar findings emerged from studies in California (Gándara et al., 2005), Georgia (Mantero & McVicker, 2006), and Kansas (Karathanos, 2009).

Beyond teacher preparation, level of education more generally seems to play a role in teachers' beliefs about ELLs and their education. In two studies, graduate education was found to be significantly related to positive attitudes toward ELLs—specifically, having a graduate degree (Byrnes et al., 1997) and having taken graduate credits (Mantero & McVicker, 2006). Two other studies reported that teachers who had studied foreign languages (Polat, 2010; Youngs & Youngs, 2001) or had taken a multicultural education course (Youngs & Youngs, 2001) held more positive attitudes.

Background factors: Teachers' language, ethnicity, and gender. Three aspects of teachers' life experiences and identities are also associated with their beliefs about ELLs and their education. Three survey studies found that proficiency in a language other than English was associated with particular beliefs or attitudes. Specifically, teachers with such proficiency were more likely than others to support heritage language maintenance (Lee & Oxelson, 2006) and bilingual education (Shin & Krashen, 1996). The third study—a survey of 218 teachers in two Southern California school districts (Ramos, 2001)—showed that the more fluent the teachers were in a second language, the more likely they were to support the use of L1 instruction in theory, but the less inclined they were to support its use in practice. Ramos (2001) inferred that these teachers' beliefs about practice were based on their own experiences as students rather than their theoretical knowledge of SLA.

The relationship between teachers' ethnicity and their beliefs about ELLs was addressed in three other studies. Hispanic/Latino teachers expressed more positive attitudes than white teachers toward the use of the native language in school in the survey of 152 Arizona teachers conducted by Garcia-Nevarez et al. (2005). In two separate studies, Marx (2000, 2002) examined the beliefs, attitudes, and perspectives of nine white and four Hispanic preservice teachers who tutored Mexican ELL students for one semester. The white tutors expressed stereotypical beliefs about the tutees, seeing them through deficit lenses and believing they needed to be “saved” from their environments. Only two of them believed the children would go to college and be as successful as the tutors themselves. All four Hispanic tutors, on the other hand, believed the children would be as successful as they were and that most of the challenges the children faced derived from barriers inherent in the school and community context rather than deficits in the children themselves or their families.

Gender was linked to teachers' beliefs about ELLs and their readiness to teach ELLs in two survey studies. Youngs and Youngs (2001) reported that females had significantly more positive attitudes about ELLs than did males in their study of 143 middle school teachers. Polat (2010) compared the beliefs about readiness and self-competencies for teaching ELLs in randomly selected samples of 83 inservice and 88 preservice teachers. In both studies, female respondents' beliefs about their readiness and competencies for assessing language were significantly more positive than those of males. The former study controlled for grade level in that all participants were 6th- to 9th-grade teachers, but the latter study included participants at all grade levels and did not control for that variable in examining gender.

Contextual factors. Five studies in this review offer insight into the relationship between features of the context within which teachers work and the teachers' beliefs about ELLs and their education. Johnson (2000) examined the beliefs and practices of teachers in two Texas elementary schools with similar student populations, both of which had bilingual programs. One school was designated an “accelerated school,” offering “enhanced” instruction for students; the other took a remedial approach. Teachers in the latter school were more likely to cite deficits—lack of English proficiency, lack of motivation, lack of readiness, and poor home environment—as reasons ELLs might fail. They also predicted higher rates of failure for ELLs and were notably less supportive of L1 instruction than teachers in the accelerated school. From her analysis, Johnson concluded that the two strikingly different school cultures resulted in different “expectation climates” for students (p. 272).

Region of the United States and the nature and history of the language minority community also seem to influence teachers' beliefs about ELLs and their education, as shown in two studies. Byrnes et al. (1997) concluded that amount of exposure to linguistic diversity led to the significantly more positive attitudes of Arizona teachers in their survey study compared to teachers in Virginia and Utah. Walker et al. (2004) examined the history, nature, and size of immigrant populations in three Great Plains communities and found that "the extent of the negative attitudes varied significantly between low-incidence, rapid-influx, and migrant-serving schools" (p. 147). Teachers in low-incidence communities had positive but "naively optimistic" attitudes toward ELLs and were the least likely of the three groups to want to have ELLs in their classes or to want professional development. Teachers in rapid-influx schools (with recent waves of immigrants and refugees) had neutral-to-positive, realistic, and informed attitudes about ELLs, and they were the most likely of the three groups to want ELLs in their classes and to be interested in professional development. Teachers in long-term migrant-serving communities expressed neutral to highly negative attitudes toward ELLs, viewing the students through a deficit lens. They typically had no professional development and were not interested in it.

Another contextual factor found to influence teachers' beliefs about ELLs is the way ELLs are represented in discourse within the larger contexts surrounding schools, a topic examined in two studies. Walker et al. (2004) identified the discourse of school administrators, a critical feature of school culture, as an influence on teachers' beliefs. In interviews teachers recounted instances in which principals and program coordinators banned any use of students' L1 in schools and, in one case, even denied federally funded breakfasts to students overheard speaking their home language. Some school leaders also did not appear to value professional development related to teaching ELLs, contributing to the negative perceptions of ELLs in the school. Harklau's (2000) three-year ethnographic study examined the representations of one group of ELLs in two institutional contexts—high school, where they were viewed as "the good kids" who were "praised and admired" by their teachers, and community college, where they were characterized as "underachieving and difficult" (p. 36). Harklau made the case that these contrasting views of ELLs derive from the "dominant representations" of ELLs in the two different institutional contexts (p. 38).

Focusing on the broader policy context, Revilla and Asato (2002) examined the impact of California's Proposition 227 on teachers' beliefs and practices vis-à-vis ELLs through an ethnographic case study of one school in Los Angeles. They found that teachers' views of the use of L1 in instruction were influenced by the sanctions against L1 in the law. The "assimilative ideologies that privilege English" embodied in Proposition 227 (p. 117) were evident in teachers' reluctance to use L1 in classes, except as necessary preparation for English-only instruction.

The Relationship Between Teachers' Beliefs About ELLs and Their Practices

We located five studies (Escamilla, 2006; Marx, 2002; Sharkey & Layzer, 2000; Yoon, 2007, 2008) that examined whether and in what ways teachers' beliefs about ELLs relate to teachers' practices—the third theme of our review. Direct evidence for this relationship is elusive because of the many interrelated influences on teachers' practices and because most of the studies included in this review gathered data through surveys, thus providing no direct evidence of teachers' practices.

A study of a Pennsylvania high school conducted by Sharkey and Layzer (2000) illustrates this line of research. ELLs in the school were commonly placed in lower-track classes, even when seemingly capable of succeeding in higher-level classes. Sharkey and Layzer attributed this practice to the teachers' beliefs that ELLs' success in school was defined by their effort and assimilation into the high school culture, not their learning outcomes. Those beliefs led the teachers to place ELLs in classes where they could feel comfortable, supported, and successful rather than where they might feel stress because of challenging material. Yoon (2007, 2008) made a similar argument for the relationship between the teachers' beliefs and their practices from her case studies of three English Language Arts teachers in a New York State middle school. One teacher believed that teaching all children, including ELLs, was her responsibility, and she actively involved ELLs in all aspect of her classes. The second teacher believed he should not have to adapt his teaching for ELLs. He included ELLs in class activities but made no special effort to scaffold their learning, resulting in their marginalization in his classroom. The third study participant viewed herself as a content area teacher who believed it was the ESL teacher's responsibility to teach ELLs, not hers, and that ELLs' would develop "literacy skills naturally and quickly" (p. 513) in an all-English classroom environment. In her classroom, ELLs were invisible; she rarely spoke to them, and because of her teacher-centered instruction, ELLs rarely spoke in class. Thus, the practices of these three teachers were consistent with their beliefs.

DISCUSSION AND IMPLICATIONS

Key Findings of the Review

Our findings highlight some troubling aspects of teachers' beliefs about ELLs. Many teachers do not feel prepared to teach ELLs or to address the challenges involved in teaching them, and they prefer not to have ELLs in their classes. Many hold deficit views of ELLs and misconceptions about language learning. Many are not interested in participating in professional development related to ELLs. On the other hand, the review offers some hope for addressing these worrisome aspects of teachers' beliefs about ELLs. Teachers who have had experience with ELLs and with diversity in general, and who have participated in some preservice or inservice preparation for teaching ELLs are more likely to hold favorable beliefs about this student population than teachers without such experience or preparation. Thus, hiring teachers with such experiences and educational backgrounds, and providing ongoing opportunities for developing their skills for teaching ELLs have the potential to increase the number of teachers with affirming beliefs about ELLs.

As the above discussion shows, several inconsistent findings emerged in this review. While teachers in several studies acknowledged they were not well prepared for teaching ELLs, many of them had no desire to participate in professional development to cultivate the needed knowledge and skills (e.g., Reeves, 2006; Walker et al., 2004). While some teachers recognized the importance of and expressed support for the use of L1 in school, they also believed that L1 should not be used at home (Karabenick & Noda, 2004), that English should be the sole language of instruction (Karathanos, 2009), and that students who are equally proficiency in English and their L1 should learn only in English (Shin & Krashen, 1996). While some teachers expressed support for

biliteracy, they did not support the maintenance of ELLs' home languages (Ramos, 2001). While some teachers believed ELLs brought valued diversity to their schools, they did not want ELLs in their own classes (Karabenick & Noda, 2004; Penfield, 1987; Walker et al., 2004). Such contradictory findings may simply represent the complex reality of schools and of human endeavors in general (Fang, 1996). It is not, after all, unusual for people to simultaneously hold incompatible beliefs and values, nor are the challenges identified by the teachers easily overcome. These findings may also derive from limitations in research design, including samples studied. More research is needed to determine how prevalent the inconsistencies identified might be and, if prevalent, what their origins and implications are.

Recommendations for Future Research

The 37 studies reviewed simply do not constitute a large enough body of research to support robust conclusions regarding teachers' beliefs about ELLs. Our first recommendation, then, is that we need more research in this area. There is an especially great need for more, and more varied, research on how teachers' beliefs are related to their practice. The five studies that examined the relationship between teachers' beliefs and their practices provide evidence for the existence of that connection, but more such research as well as other types of research (e.g., quasi-experimental, longitudinal) are needed to support these conclusions and tease apart the nuances of the connection.

Our second recommendation is that we need a more coherent research agenda regarding teachers' beliefs about ELLs to substantially advance the understanding of those beliefs (Lucas & Grinberg, 2008). Such an agenda (or perhaps multiple agendas) encompassing multiple studies would likely yield conclusions that could be embraced with greater confidence than conclusions from individual studies. In fact, the relative strength of the conclusions we have drawn about our first two themes (what teachers believe and what variables are associated with their beliefs) derives partly from the fact that there is greater coherence in these two bodies of research than in the third (the relationship between beliefs and practice). For example, some studies focusing on the first two themes used or adapted instruments from previous work, as shown in Table 26.1. For the most part, however, the studies for all three themes—but especially for the last one—took different approaches to exploring the issue, were guided by different purposes, and were conducted in different settings with different types of samples and different research methods. This lack of coherence makes it difficult to draw conclusions about teachers' beliefs across multiple studies.

A research agenda encompassing multiple studies would help to ameliorate another pervasive problem in research on teachers' beliefs about ELLs: the prevalence of small-scale, local studies. Studies reviewed here drew participants from one or two schools (7), one or a few school districts (11), or one university teacher education program (10). Only 4 studies had more than 200 participants. A research agenda could be designed to support a balance of large and small studies and a plan for conducting them in particular locations, which would make it possible to examine both the complexities of the local context and the broader patterns across multiple contexts. Similarly, such an agenda could ensure a balance of qualitative and quantitative studies to capture the nuances of local contexts as well as to shed light on how applicable the findings might be for other settings.

Our third recommendation for research is that more rigorous standards for clarity and thoroughness in reporting on research processes be applied to the research on teachers' beliefs about ELLs. There was little consistency in the terms used to refer to the psychological construct (e.g., *beliefs*, *attitudes*) being studied. Some works used different terms interchangeably, for example, treating *belief*, *attitude*, and *perspective* as if these were synonyms. Similarly, and consistent with the empirical literature on teacher beliefs (cf. Fives & Buehl, 2012; Pajares, 1992), none of the studies we reviewed defined *belief* or other related construct(s). Given this lack of precision, it is difficult to know with any clarity what is actually being studied. Another reporting shortcoming was that the sample selection processes were not always clearly described. Too often, authors simply stated that they administered a survey to or interviewed a certain number of teachers in a particular context without describing how the participants were selected. Equally important, the characteristics of the participants were not always clearly described. Some studies included participants in varied school contexts, grade levels, and subject areas, and with different types and amounts of preparation for teaching ELLs without fully describing these differences or taking them into account in their analysis. Given the importance of background and experiential variables in teachers' beliefs about ELLs discussed previously, researchers must provide such information about study participants to assist with the interpretation of findings. Finally, while several studies made use of instruments designed and previously used by others, as discussed above, many of the studies reviewed reported little or no information about the validity and reliability of tools used to collect data.

Implications for Teacher Preparation and Professional Development

The findings of our review suggest several implications for teacher preparation and professional development. The most obvious is that all teachers should have some focused preparation for teaching ELLs through preservice preparation and/or inservice professional development. The evidence supports the conclusion by Walker and her colleagues (2004) that "even a little appropriate training can go a long way in preventing and improving negative teacher attitudes" (p. 142). Equally clear is the need to ensure that preservice teachers and practicing teachers have exposure to and contact with ELLs through which they can interact with and get to know ELLs as individuals. As part of their preparation, preservice and practicing teachers also need to explicitly examine their beliefs, attitudes, and perceptions of ELLs and their families in supportive contexts through such practices as debriefing after interactions with ELLs, (guided) reflective writing, and examination of common myths about ELLs and their learning (Griego-Jones, 2002; Karathanos, 2009; Walker-Dalhouse et al., 2009). Finally, teachers should be encouraged to develop proficiency in a language other than English, given that such proficiency is associated with more positive beliefs about ELLs.

Our review also has implications for teacher recruitment and selection. The findings regarding variables related to teacher beliefs suggest that we should recruit more general education teachers who are bilingual, who have some proficiency in a language other than English, and who have had contact with linguistic diversity and language minority communities. Likewise, we should consider these factors in making decisions about admission to teacher education programs, as candidates with this ability and experience are likely to have more positive beliefs about ELLs.

The growing number of ELLs in U.S. schools and the trend toward placing them in regular classrooms for a large portion of the school day offer compelling reasons to prepare all classroom teachers to teach ELLs. Such preparation must give attention to teachers' beliefs about ELLs because their beliefs play an important role in their instructional practice as well as their other types of interactions with students, and because teachers' beliefs about and expectations of students who depart from the "mainstream" can have disastrous consequences for those students in school and beyond. While the small body of literature examining teachers' beliefs about ELLs suggests several actions to support the development of affirming and supportive beliefs among teachers of ELLs, a more robust body of research is needed. We hope this review can inform future research in this area.

NOTE

- 1 We use the term *teacher* to refer to practicing general education teachers unless otherwise specified.

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Escamilla (2006)	All 18 Ts in a Denver school (12 bilingual)	Qualitative: Interviews with Ts, 762 student writing samples	Thematic coding, Holistic assessment of writing samples	✓	✓	✓	✓
Flores & Smith (2008)	564 Ts in 14 districts in a TX community	Survey (based on Byrnes et al., 1997)	Multivariate analysis	✓	✓		
Gándara et al. (2005)	5,300 educators from 22 CA districts	Mixed methods: Survey, four focus groups	Descriptive and inferential statistics, Thematic coding	✓	✓	✓	✓
García-Nevarez et al. (2005)	157 bilingual, ESL & mainstream Ts in 5 AZ districts	Mixed methods: Survey, focus groups w/15 Ts	ANOVA, Thematic coding	✓	✓	✓	✓
Griego-Jones (2002)	91 preservice Ts in a beginning TED course	Survey	Descriptive statistics	✓	✓		
Harklau (2000)	3 ELLs – last year of high school, 1st year of college	Ethnography	Thematic coding	✓			✓
Hernández (2001)	Two 4th/5th grade Ts, and four students in a CA school	Ethnography	Text analysis of interviews and documents	✓			
Johnson (2000)	38 Ts from 2 TX elementary schools	Mixed methods: Bilingual School Climate & Instructional Methodology Inventory, interviews, documents, observations	Descriptive statistics, Thematic coding	✓			✓

¹ All instruments were designed by the authors unless otherwise specified.

(Continued)

Marx (2002)	(same as Marx 2000)	Qualitative: Interviews, observations, journals	Thematic coding	✓	✓	✓
O'Brien (2009)	123 HS social studies Ts in a FL district. (All 344 Ts were surveyed.)	Mixed method: Survey (developed by Reeves, 2006), interviews with 8 Ts	Descriptive statistics, Thematic coding	✓		
O'Neal et al. (2008)	24 K-5 Ts in a rural elementary school in Eastern NC	Mixed methods: Demographic survey, focus groups	Descriptive statistics, Thematic coding	✓		
Penfield (1987)	162 Ts from 6 NJ counties w/ELLs but no ELL prep, participating in required PD	Qualitative: Open-ended questionnaire	Content analysis	✓	✓	✓
Polat (2010)	83 inservice and 88 preservice Ts at a university in the Eastern U.S.	Quantitative: Background Questionnaire (Byrnes et al., 1997; Youngs & Youngs, 2001); Beliefs about Readiness and Competencies Questionnaire; Beliefs about Program Improvement Questionnaire	Multivariate analyses	✓	✓	✓
Ramos (2001)	218 Ts from 2 So CA elementary districts (582 Ts were surveyed.)	Survey	Factor analysis, correlation, regression analysis, ANOVA			✓

(Continued)

Table 26.1 (Continued)

Author(s) (Year)	Sample	Research Methods		What Teachers Believe					Variables Related to Teacher Beliefs				
		Methods	Analysis	Preparedness	Challenges	ELLs' Ability & Potential	Inclusion in Mainstream	Language Learning	Experience w/ Diversity/ELLs	Preparation	Background Factors	Context	Beliefs/Practices
Reeves (2006)	279 content Ts in 4 high schools in SE U.S. city	Survey	Descriptive statistics	✓	✓	✓	✓	✓					
Revilla & Asato (2002)	Three districts in Los Angeles	Ethnography	Thematic coding										✓
Rodriguez et al. (2010)	11 inservice Ts in NC taking an online Methods of Teaching ELLs course	Pre-/post-course survey	Descriptive statistics	✓		✓							
Sharkey & Layzer (2000)	35 Ts of academic subjects with ELLs in their classes in one HS in Central PA. (48 Ts were surveyed.)	Mixed methods: Survey (Penfield, 1987), interviews w/10 teachers, observations of 26 classes	Case studies: Thematic coding and cross-case analysis										✓
Shin & Krashen (1996)	794 elementary and secondary Ts from 6 CA districts	Survey	Descriptive statistics, multiple regression				✓	✓	✓	✓			✓

Siwatu (2007)	275 preservice Ts enrolled in two Midwest TE programs	Quantitative: Academic and Demographic Background Questionnaire, Culturally Responsive Teaching Self-Efficacy Scale, Culturally Responsive Teaching Outcome Expectancy Scale	Descriptive statistics, Factor analysis	✓
Walker et al. (2004)	<ul style="list-style-type: none"> 422 K-12 Ts at 28 schools in 3 communities in a Great Plains state All 6 ELL Ts in the schools 	Mixed methods: Survey of mainstream teachers, interviews with ELL teachers	Chi-square, t-tests, Thematic coding	✓
Walker-Dalhouse et al. (2009)	53 preservice Ts in a course at a Midwest univ and a comparison group	Quasi experimental: Pre-post course questionnaires	MANOVA tests on pre/post experimental and comparison group	✓
Yoon (2007)	Mainstream middle school language arts, reading and social studies teacher in NY	Qualitative case study: Interviews, field notes, observations, logs, lesson plans, student projects, interviews with 2 students	Thematic coding and triangulation	✓

(Continued)

Table 26.1 (Continued)

Author(s) (Year)	Sample	Research Methods		What Teachers Believe						Variables Related to Teacher Beliefs				
		Methods	Analysis	Preparedness	Challenges	ELLs' Ability & Potential	Inclusion in Mainstream	Language Learning	Experience w/ Diversity/ELLs	Preparation	Background Factors	Context	Beliefs/Practices	
Yoon (2008)	3 middle school English language arts Ts in NY	Collective case studies: Classroom observations and interviews w/Ts & 6 students	Thematic coding and triangulation	11	6	9	5	13	10	9	8	5	5	✓
Youngs & Youngs (2001)	143 mainstream Ts in two middle schools in a Great Plains state. (224 Ts were surveyed.)	Survey	Descriptive statistics, F-tests, t-tests				✓		✓	✓	✓			
Zainuddin & Moore (2004)	16 Preservice Ts in an introductory TESOL course	Qualitative: Participant field notes, notes of classroom discussions, mid- and post-field experience interviews, participant field reports	Thematic coding					✓	✓					

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TEACHERS' BELIEFS ABOUT STUDENTS WITH SPECIAL NEEDS AND INCLUSION

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The majority of students with special needs or disabilities (SWDs) spend most of their school days in general education classrooms (U.S. Department of Education, 2012). Successful inclusion of SWDs in general education classrooms is dependent, therefore, on both general and special education teachers' knowledge, skills, and collaboration (Brownell et al., 2012). Teachers, however, may hold different beliefs about how to support included students. SWDs may require more and different kinds of support than other students (Fuchs, Fuchs, & Compton, 2012); whether they get this support often depends on the individual teacher and, likely, the teacher's beliefs (Jordan, Glenn, & McGhie-Richmond, 2010).

Because teachers' beliefs about SWDs seem to have a strong influence on their actions in the classroom, they are important to understand (Borko & Putnam, 1996; Calderhead, 1996). The challenge in studying beliefs, however, is that they are complex. Teachers hold beliefs about curriculum, the nature of content, students and what they bring to the classroom, their role in helping students, and their own efficacy in helping different types of students (Richardson, 1996). How these different sorts of beliefs are at work in the minds and actions of special and general education teachers is important to examine because teachers' actions affect whether SWDs are able to progress successfully.

Overview

In this chapter, we analyzed literature on the types of beliefs general and special education teachers hold and how teachers' beliefs may change depending on the

students they are teaching, nature of their context, subject matter they teach, or available professional learning experiences. We understand teachers' beliefs to be distinct from, but closely related to, teachers' attitudes (Pajares, 1992). This distinction is not always clear in the literature, however, and we included studies that used either or both terms and followed the usage of the original researchers. We focused on teachers' beliefs about working with students with high incidence disabilities and used the terms *SWDs* and *students with special needs* interchangeably to refer to students with high incidence disabilities although we acknowledge these terms generally include students with a broad array of special needs (Individuals with Disabilities Education Act, 2004). High incidence disabilities are the most prevalent and include specific learning disabilities, emotional/behavioral disabilities, speech/language impairments, and mild/moderate intellectual disabilities; students in this group are likely to spend all or most of the school day in a general education setting and are served by both general and special education teachers (U.S. Department of Education, 2012).

We included studies conducted in the United States and Canada, as the inclusion of SWDs is an important agenda in both countries, identified through searching databases with the terms: teacher, beliefs, SWDs, and special education, in addition to ancestral and progeny searches of studies of interest and hand searches of leading journals. More than 1,000 articles were identified; we eliminated those that did not include an empirical study or had limited descriptions of participants, methods, or measures, and those whose purpose or research questions were not focused on teachers' beliefs about SWDs or inclusion. Thirty-four studies were included.

Overall, research exploring special and general education teachers' beliefs about SWDs was limited in scope and diverse in the types of beliefs examined. We describe findings from research on teachers' beliefs about inclusion (e.g., Scruggs & Mastropieri, 1996), teachers' beliefs about instruction and assessment (e.g., Berry, 2006), teachers' beliefs about SWDs (e.g., Jordan & Stanovich, 2003), teachers' self-efficacy beliefs (Coladarci & Breton, 1997), and changing teachers' beliefs through teacher preparation and professional development to draw conclusions and identify areas for future research.

Teachers' Beliefs About Inclusion

As inclusion became a more pervasive practice in the mid 1980s into the 21st century, researchers became interested in general education teachers' attitudes about including SWDs, mostly using surveys to tap a broad array of beliefs about inclusion and mainstreaming. Inclusion is providing SWDs access to the general education curriculum within general education settings; in contrast, the older term *mainstreaming* commonly refers to physical placement in general education classrooms, but does not convey the idea of access to the general education curriculum (Sorrells, Rieth, & Sindelar, 2004). Scruggs and Mastropieri (1996) summarized 28 studies conducted between 1958 and 1995 that explored general education teachers' attitudes about mainstreaming or inclusion. Two-thirds of general education teachers supported concepts of mainstreaming and inclusion; however, fewer were willing to include SWDs in their classrooms (p. 62). Teachers' willingness to support SWDs varied with the kind and severity of the disability and the obligations involved in providing

instructional and behavioral support. Only one-fourth to one-third of teachers felt they had sufficient time, preparation, or resources to include SWDs effectively (p. 71). Results of studies did not change over time; Scruggs and Mastropieri concluded general education teachers were no more prepared to be effective in serving SWDs in 1995 than they had been more than three decades previously (p. 71).

In response to Scruggs and Mastropieri's (1996) distressing findings, Cook, Semmel, and Gerber (1999) said beliefs of other personnel at the school site such as the principal and special education teachers may be important to the success of SWDs, but their findings were equally concerning: 69.38% of principals and 57.81% of special education teachers agreed general education teachers could not meet SWDs' needs. Cook et al. surveyed principals and special education teachers at diverse elementary and junior high schools in California using 21 Likert style items selected from the Regular Education Initiative Teacher Survey (Semmel, Abernathy, Butera, & Lesar, 1991). Principals had more positive beliefs about inclusion than special education teachers; the teachers were concerned about the protection of mandated resources and effectiveness of consultant services for general education teachers. Special education teachers' reservations were cause for concern since they are likely the most knowledgeable school personnel regarding the needs of SWDs.

Echoing the concerns of Cook et al. (1999), Buell, Hallam, Gamel-McCormick, and Scheer (1999) found special education teachers had more favorable beliefs about inclusion than their general education counterparts. They examined differences between general and special education teachers' confidence in working with students with disabilities and teachers' perceptions of their needs for training, support and resources through a multivariate analysis of variance ($n = 289$; 53% return rate) of responses to a questionnaire that included 25 Likert-style questions, yes/no questions and open-ended questions. Special education teachers believed they were better prepared than general education teachers to help include SWDs in general education settings. General education teachers were not confident about writing IEPs or participating in IEP meetings; of more concern was that they also were not confident about providing individual support, managing behavior, writing behavioral objectives, or adapting curriculum and materials—practices essential to inclusive practice.

As in the studies above, DeSimone and Parmer's (2006) study showed teachers were both positive about the idea of inclusion and concerned about the practice of inclusion: 80% of middle school mathematics inclusion teachers ($n = 228$; 63% agreed or strongly agreed that SWDs should be included in general education math classes and 68.8% agreed or strongly agreed general education teachers are responsible for the learning of SWDs in a nationwide survey; 58.3% of teachers were undecided, disagreed, or strongly disagreed that inclusive classrooms were the best place to teach math to SWDs and only 29% believed middle schools were implementing inclusion effectively (p. 102). The *Survey on Teaching Mathematics to Students With Learning Disabilities in Middle School* included mostly Likert style items on teachers' beliefs about inclusion in mathematics classes, students with learning disabilities and teachers' background and preparation; researchers performed follow-up interviews with a smaller purposeful sample and used interview data to illustrate findings. Only 23.2% of teachers believed they had sufficient time to prepare for teaching inclusive mathematics classes. Less than one-third believed their teacher

preparation gave them useful philosophies or strategies or helped them to understand the characteristics of SWDs with regard to teaching mathematics.

Ernst and Rogers (2009) surveyed 149 high school general and special education teachers in Connecticut with the 27 item *Inclusion Attitude Scale for High School Teachers* based on Eagly and Chaiken's (1993) survey of attitudes. Although the response rate was low (24%), the scale's development was described in great detail. Researchers used multivariate analyses of variance to examine relationships among the three internal factors: cognitive beliefs about inclusion, affective responses to inclusion, and behavioral responses to inclusion. Teachers who had taken at least one special education class or participated in at least four days of professional development had significantly more positive attitudes towards inclusion than those who had none as did teachers who had more experience in inclusive classrooms and knowledge of available staff supports and instructional materials. The nature of the classes, professional development, staff supports, and materials, however, was not specified, nor was the number of years of experience that made the difference in supporting positive attitudes.

How teachers' beliefs about and attitudes towards inclusion might be related to their inclusive practices is an important question; however, the relationship is not clear as the influence of teachers' beliefs about inclusion on instruction for included SWDs has received little attention in the research literature. Only one study was found that examined the relationship between general and special education teachers' beliefs about inclusion and their instructional practices. Robinson (2002) studied the beliefs and practices of four high school science teachers through qualitative interviews focused on teachers' beliefs about instruction for SWDs that included questions on planning, instruction, and assessment. He also observed 1 or 2 periods of instruction for teacher-student interactions and interactions between SWDs and other peers. Data were coded and analyzed according to the constant comparative method. Despite their positive beliefs about inclusion, teachers engaged in practices that either supported the learning of SWDs or did not. Teachers implemented accommodations (e.g., providing extended time on assignments) as indicated in students' Individual Education Programs and provided some in-class supports, such as having students work with stronger peers. They did not, however, differentiate instruction (e.g., providing additional small group instruction). Most observed lessons were comprised of lectures using visuals and questioning and teachers reported using peer collaboration and hands-on learning opportunities during labs. Teachers said limited collaboration with special education professionals, small numbers of included SWDs, and pressures to prepare students to pass standardized tests interfered with planning individually for included SWDs. Context, however, was not the only influence operating on these teachers; their beliefs were also relevant because the teachers believed since learning outcomes were the same for all, instruction should be similar. Findings from this study demonstrate that teachers' positive beliefs about including SWDs do not always translate into effective instruction for SWDs.

Taken together, findings from studies of teachers' beliefs about inclusion indicated that although many general and special education teachers held positive views of inclusion, they also had reservations about implementing inclusion, suggesting that beliefs about inclusion were related to a beliefs domain that was not

connected to teachers' day-to-day actions. Teachers' beliefs about practices for the actual inclusion of students with disabilities, on the other hand, seemed to be tapping a different domain that may be more closely connected to teachers' classroom behaviors. Special education teachers felt concerned about their own abilities to successfully meet SWDs' needs, especially if those needs were complex. General education teachers may be more or less willing and able to include SWDs depending on a variety of contextual variables (e.g., the number of SWDs included or the severity of the child's disability). It is not clear that general education teachers were able to provide much support beyond mandated accommodations, probably due to concerns also voiced by special education teachers about the scarcity of resources such as time, training and in classroom support. Overall, findings from the more recent studies support earlier conclusions of Scruggs and Mastropieri (1996) related to teachers' concerns about inclusion with the notable addition to teachers' concerns of perceived pressure to prepare SWDs to perform on standardized tests.

Teachers' Beliefs About Instruction

Special education has a long history of identifying research-based practices for improving student learning and educating teachers to use these practices; general and special education teachers' beliefs about the acceptability of these interventions is an important consideration for those seeking to help teachers integrate research-based practices into their instruction. In this section, we explored limited research on teachers' beliefs about instruction and assessment for SWDs.

Boardman, Arguelles, Vaughn, Hughes, and Klingner (2005) studied special education teachers' reasons for selecting practices through qualitative analysis of focus group interviews with 49 K-5th grade teachers in four school districts in Texas and Florida. They found teachers did not select practices based on research evidence; rather, their decisions were based on pragmatic concerns. When special education teachers were considering whether to use a practice, they wanted to know: (a) how feasible it would be to implement given the excessive demands on their time, (b) how appropriate the practice was for their students, (c) whether they would have access to materials and professional development to assist their implementation, and (d) how the practice met their students' needs.

Only one study examined teachers' beliefs about providing instruction to SWDs and their observed classroom practices (Berry, 2006). Berry qualitatively analyzed interviews and observations of 5 elementary teachers in 2 teams to investigate links between teachers' beliefs about teaching, learning, and inclusion, and the nature of writing instruction provided. Berry found teachers believed SWDs should be included in general education classrooms and described both teams' writing instruction as environmental—neither totally skills based nor totally natural learning based. Teachers, however, used different metaphors to describe their instruction. These metaphors seemed based on teachers' views of ability and were directly related to their instructional approaches.

One team believed in a structured, sequenced curriculum with steps and levels students progressed through (Berry, 2006). "Students who lacked writing skills were seen as out of order or broken; therefore, instruction involved directing the process

of repairing the malfunctioning part or parts” (Berry, p. 18). Each student learned at his or her own pace within the same curriculum. Team 2 understood writing as relational rather than structural (i.e., they believed writing was primarily a tool for communication rather than a skill in itself). They supported SWDs within a structure that moved students from whole group to small group to independent work that provided opportunities for peer support. SWDs were seen as “vulnerable, requiring a protected context in which they would find trust and safety” so they would be “empowered” to “take risks and try things” (Berry, p. 20). Overall, the study highlights the complicated nature of relationships among beliefs and practices and provides support for using interviews and observations to tease out those relationships.

Bos and colleagues investigated teachers’ theoretical orientations to reading using a survey based on DeFord’s (1985) earlier work that they adapted to address teachers’ sense of preparedness for teaching struggling readers and specific instructional approaches effective for these students (Bos, Mather, Dickson, Podhajski, & Chard, 2001; Bos, Mather, Narr, & Babur, 1999). In both studies, researchers administered a 25 item survey with Likert-style responses reflecting teachers’ attitudes toward statements supporting whole language instruction or explicit and structured language instruction. Participants included 252 preservice teachers and 286 K-3rd grade teachers in 20 districts (Bos et al., 2001) and 22 teachers in two schools (Bos et al., 1999). Factor analysis revealed two dimensions of teachers’ beliefs were related to early reading instruction: explicit and implicit code instruction. Explicit instruction items focused on the importance of teaching phonics and phonological awareness and using controlled text to help students apply their newly acquired phonics knowledge. Implicit code instruction items focused on more naturalistic approaches for helping students learn to read such as time spent reading, learning to use context clues, and adult-child shared book reading. Preservice and inservice teachers leaned toward an explicit code approach for teaching students to read, but the degree to which they embraced such an approach in their instruction was not studied.

It is difficult to draw conclusions across four studies that are entirely different in their purposes although the findings echo concerns in the broader literature. Findings from the Boardman et al. (2005) study support other research demonstrating teachers’ practical considerations when making instructional decisions, such as the concerns about time, materials and training found in the studies of teachers’ beliefs about inclusion above. Berry’s (2006) findings support a history of research in general education showing that teachers’ beliefs about the nature of instruction and students’ ability influence what they do in their classrooms. More research is needed in order to better understand relationships among teachers’ beliefs about instruction, influences on those beliefs, and their instructional practice.

Teachers’ Beliefs About SWDs and Disability

Jordan and Stanovich (2001, 2003, 2004) found general education teachers’ beliefs, specifically their beliefs about disability and the role these beliefs play in instructing SWDs, were related to effective teaching practices. To investigate teachers’ beliefs, Jordan and Stanovich (2003) developed an teacher interview that produced a

narrative scored using a rubric; the score was interpreted as falling on a continuum of beliefs about the nature of students' disabilities and teachers' role in furthering students' learning from pathognomic to interventionist (P-I) (Jordan & Stanovich, 2003). Pathognomic teachers believed disability was an inherent, unchangeable characteristic of a student that teachers could do little to remediate and that responsibility for instructing SWDs belonged to someone other than classroom teachers. Interventionist teachers believed that disabilities could be addressed successfully with accommodations and that classroom teachers were responsible for ensuring student learning.

Stanovich (1994), Stanovich and Jordan (1998), and Jordan et al. (2010) made connections between teachers' beliefs as measured by the P-I Interview and effective instructional practice. Effective instructional practice was assessed according to the Classroom Observation Scale (COS) (Stanovich & Jordan, 1998) that contained items in two parts: (1) the class as a whole, and (2) interactions between the teacher and three students: one with a disability, one regularly achieving, and one at risk of failure. The COS was based on Englert, Tarrant, and Mariage's (1992) synthesis of effective instruction (Jordan et al., 2010). In summing up studies in which they used the P-I Interview with the COS to investigate the relationship between teachers' beliefs and practices, Jordan and colleagues (2010) concluded that teachers' beliefs about SWDs are related to their teaching practices (p. 19). Teachers who demonstrated interventionist beliefs were judged to be more effective overall (Stanovich, 1994; Stanovich & Jordan, 1998): they spent more: (a) time on instruction, (b) time engaged in individual and small group talk, and (c) time in academically focused talk. They also organized class routines effectively so that there was little wasted time.

In another set of studies (Jordan, Lindsay, & Stanovich, 1997; Jordan & Stanovich, 2001), nine teachers' P-I beliefs were compared to scores on a measure of teacher to student interactions that examined student-teacher dialogue. Pathognomic teachers had the least amount of interaction with at risk students or SWDs and their dialogue with students was mostly non-academic. Teachers who were neither pathognomic nor interventionist demonstrated classroom practices that were similar to teachers with pathognomic beliefs. The teachers with Interventionist beliefs spent more time both interacting with at risk and exceptional students and engaging in academically focused dialogue with all of their students. Interventionist teachers interacted with low achieving students for almost twice as long as other students and their interactions overall were more frequent and characterized by higher levels of cognitive engagement. In sum, teachers' P-I beliefs were related both to the amount and frequency of academically focused dialogue with low achieving students and to the overall amount of instructional time allotted them.

Jordan and Stanovich's body of work over 20 years makes a strong case to support findings that general education teachers differ in their beliefs about ability and disability and that those beliefs influence instructional practice for SWDs. Further, teachers' P-I beliefs are related to the effectiveness of their practice, not just for SWDs but for all students. Additionally, their findings are substantially consistent across studies, providing strong support for using the P-I interview to investigate teachers' beliefs and for the importance of teachers' beliefs about disability to their ability to enact effective practices.

Teachers' Self-Efficacy Beliefs and Their Role in Educating SWDs

Self-efficacy beliefs are judgments of one's ability to perform a particular task in a particular context (Bandura, 1986). Thus, teachers' self-efficacy beliefs are likely to change depending on their perceptions of the demands a particular context places on their knowledge and skills. For teachers working with SWDs, teachers' self-efficacy beliefs depend on teachers' beliefs about their ability to both educate SWDs in general and in special education contexts, and work with different types of learners as the educational needs of SWDs are diverse.

Research on teachers' self-efficacy beliefs for working with SWDs was conducted prior to 2000 by a handful of researchers and focused on special and general education teachers' sense of efficacy and its relationship to their beliefs about the extent to which SWDs should be included in general education teachers' classrooms. All but one study conducted by Brownell and Pajares (1999) assessed teachers' sense of efficacy using surveys based on Gibson and Dembo's (1984) survey of personal and general teaching efficacy. These studies included general and/or special education teachers providing instruction at all grade levels. Items assessed personal teaching efficacy, the extent to which the individual teacher believed that he or she was able to influence student learning and general teaching efficacy, the extent teachers believed student learning was influenced by teachers rather than other aspects of the environment. Although findings from these studies were complex, a higher sense of personal and general teaching efficacy predicted favorable attitudes toward including students in general education classes or a reduction in referral rates to special education (Podell & Soodak, 1993; Soodak, Podell, & Lehman, 1998). Some combination of teachers' prior experience in special education or with inclusion, feedback from supervisors, and perceived nature of students' difficulties tended to predict personal teaching efficacy (Minke, Bear, Deemer, & Griffin, 1996) or both general and personal teaching efficacy (Coladarci & Breton, 1997). Reported use of differentiated instruction, collaborative support of colleagues, and personality traits interacted with personal or general teaching efficacy to predict willingness to include SWDs (Soodak, Podell, & Lehman, 1998). Finally, Allinder (1995) found that special education teachers' personal and general teaching efficacy affected how teachers responded to professional development on curriculum-based measurement. Teachers with higher personal teaching efficacy made more goal changes based on student data than teachers with lower levels of personal teaching efficacy and teachers with higher levels of general teaching efficacy made more goal changes and developed more ambitious goals than teachers with lower levels of general teaching efficacy.

Brownell and Pajares (1999) used path analytic techniques to analyze the complex relationships among teacher education, school context factors, personal self-efficacy for teaching and managing the behavior of SWDs (on an instrument generated by the researchers to rectify concerns that the measurement of teacher efficacy be contextualized), and elementary teachers' perceptions of success in teaching SWDs, particularly those with learning and behavior problems. The survey used by Brownell and Pajares had 8 scales, including a scale with 11 items to assess teacher efficacy for teaching students with learning and behavior problems. Alpha coefficients for each of the scales ranged from .76 to .96. These researchers found that general education teachers with a higher sense of teacher efficacy were more likely to view themselves as

successful in teaching SWDs. Further, teacher efficacy mediated the influence of collegiality and preservice preparation on their perceived success. Teachers with higher ratings of teacher efficacy were more likely to perceive themselves as successful when they experienced (a) more collegiality with both their general and special education colleagues, and (b) higher quality of preservice preparation in special education.

In 2001, Tschannen-Moran and Hoy discussed the problems associated with the measurement of teachers' sense of efficacy, particularly the Gibson and Dembo (1984) survey of teacher efficacy; they argued that differences between personal teaching efficacy and general teaching efficacy were not well articulated and they questioned the "extent to which teaching efficacy is specific to given contexts and to what extent efficacy beliefs are transferrable across contexts" (p. 784). Since 2001, only three studies have focused on general education and special education teachers working with SWDs and all have used the Gibson and Dembo survey.

One study conducted by Tournaki and Podell (2005) examined elementary and middle school teachers' personal and general teaching efficacy for general education teachers working in New York City's schools. Teachers were less likely to believe inattentive students would be successful academically if they had low general teaching efficacy. Graham and colleagues (2001, 2003) used an adapted version of the Dembo and Gibson (1984) two-factor survey in two studies. Items were modified to focus on efficacy for teaching writing. Graham, Harris, Fink, and MacArthur (2001) examined the relationship among teachers' sense of efficacy and orientations about teaching writing. In this study, the teachers who emphasized correct mechanics in writing had lower general teaching efficacy. Teachers with higher levels of personal teaching efficacy spent more time focused on writing each week and reported teaching writing processes and grammar and usage skills more frequently. Graham, Harris, Fink-Chorzempa, and MacArthur (2003), however, found that neither type of efficacy predicted the number of writing adaptations that teachers made in inclusive classrooms.

Overall, measures of teachers' sense of efficacy predicted teachers' decisions about SWDs' placement and their instruction. We need to understand better, however, how teacher efficacy should be defined and assessed for teachers working with SWDs since the constructs of general and personal teaching efficacy appear to have some overlap based on these studies.

Changing Teachers' Beliefs Through Teacher Preparation and Professional Development

Researchers have demonstrated teachers' attitudes and beliefs can be changed through either preservice preparation efforts or professional development, but how or whether such changes were sustained was not clear. In Leko, Brownell, Sindelar, and Murphy's (2012) review of this literature, a course or set of courses were effective in changing preservice teachers' attitudes and beliefs about including SWDs. For this chapter, we focused on studies based on extended efforts designed to change teachers beliefs because the many studies we found examining attitudinal and beliefs changes that resulted from participation in only a single course were diverse in their purposes (e.g., McCray & McHatton, 2011; Shippen, Crites, Houchings, Ramsey, & Simon, 2005) and beyond the scope of this review.

Only two studies demonstrated how a sequence of coursework and field experiences could be used to change preservice teachers' attitudes and beliefs about addressing SWDs' needs in inclusive classrooms; findings of these studies were mixed (e.g., Swain, Nordness, & Leader-Janssen, 2012; McHatton & Parker, 2013). In both, preservice teachers participated in an introductory special education course coupled with a field experience that provided opportunities to work with SWDs in general and special education settings. Researchers captured preservice teachers' beliefs about SWDs and students without disabilities using a survey that contained Likert style scale items (McHatton & Parker, 2013; Swain, Nordness, & Leader-Janssen, 2012). In both studies, coursework was combined with field experiences. McHatton and Parker (2013) provided elementary preservice general and special education teachers opportunities to co-teach while taking coursework exploring challenges associated with inclusion and stakeholders' perceptions of inclusion. Swain et al. (2012) studied general and special education elementary and secondary preservice teacher candidates in an introductory special education course. The course incorporated 20 hours of field experience in which preservice candidates worked with and observed SWDs in a variety of settings. Results from both studies showed general education preservice teachers' beliefs about SWDs were more positive as a result of their participation. McHatton and Parker found, however, that special education preservice teachers' beliefs were slightly more negative after participating in the co-teaching field experience. These authors speculated that this downward shift in support for inclusion by preservice special education teachers may be due to complexities of co-teaching.

A more programmatic approach for changing preservice teachers' attitudes towards inclusion and knowledge about instruction for included SWDs was examined in Van Laarhoven et al.'s (2006) study of general and special education preservice teachers participating in a series of institutes focused on facilitating positive attitudes towards SWDs, a course on effective instructional and management techniques, and a field experience in an inclusive classroom. Attitudes toward inclusion were assessed pre and post using the survey developed by Minke et al. (1996), and knowledge was assessed pre and post using curricular probes developed by the researchers. Although general and special education preservice teachers demonstrated gains in their knowledge compared to a comparison group, their attitudes towards inclusion were not significantly different from the attitudes of the comparison group.

Inservice teachers with access to professional development (PD) training about teaching SWDs were more likely to report feeling better prepared to teach in inclusive environments (Bos, Mather, Dickson, Podhajski, & Chard, 2001; Ernst & Rogers, 2009); however, researchers did not investigate how specific PD innovations influenced teachers' attitudes and beliefs about inclusion or SWDs. Only one study showed that teachers' beliefs about effective instruction for SWDs changed when PD was provided. Bos, Mather, Narr, and Babur (1999) examined how 11 general education, special education, and reading education teachers' beliefs and knowledge changed due to participation in a literacy PD. The PD involved a course that helped teachers learn about factors that affect early reading and spelling development, assessments that could detect reading difficulties, and effective teaching strategies for remediating difficulties. Teachers also participated in monthly collaborative

follow-up meetings where teachers shared implementation efforts and student progress using data collected. Data were collected using (a) the Teacher Perceptions about Early Reading and Spelling, an instrument designed to measure beliefs that was discussed in the Bos et al. (2001) study, and (b) the Structure of Language assessment of teacher knowledge adapted from previous surveys. The teachers also kept weekly logs of their activities and student reading outcomes were assessed. After, teachers' attitudes towards explicit decoding instruction became more positive; however, their beliefs about whole language did not. The teachers became more knowledgeable about various language structures and their students improved on a variety of reading outcomes.

Findings from these studies provided tentative evidence preservice preparation and professional development can be effective in changing general education and special education teachers' beliefs and attitudes about teaching SWDs. The diversity of this research, however, makes it difficult to draw conclusions about what types of beliefs and attitudes can be changed, or what features of teacher learning experiences promote changes in beliefs. Further, researchers provided no information about how changes in beliefs were related to changes in practice or how changes in beliefs were sustained, particularly when preservice teachers entered the classroom.

CONCLUSIONS, CHALLENGES, FUTURE RESEARCH, AND RECOMMENDATIONS

The investigation of teachers' beliefs about SWDs and inclusion is a line of research that seems to have persisted in the emergent stage despite researchers' concern with teachers' beliefs for more than 40 years (e.g. Wehling & Charters, 1969). The studies reviewed within this chapter are diverse in their methods and purposes. Thus, it is difficult to trace the development of a clear and well-specified line of research in this area. One notable exception is the work of Jordan and Stanovich. These researchers and their colleagues have established that beliefs about disability and ability can be assessed validly and that assessing such teachers' beliefs can distinguish teachers more likely to engage in interactive and cognitively demanding instruction for SWDs from teachers who are likely to both spend less time interacting with SWDs and provide less effective instruction overall.

Despite the diverse nature of the remaining research, there are findings that are worth noting. For one, there seems to be a link between teachers' self-efficacy beliefs and their willingness to include SWDs in general education classrooms (e.g., Brownell & Pajares, 1999). Second, teacher preparation or professional development experiences that help general and special education teachers better understand how to address SWDs' needs seem to influence their attitudes and beliefs (e.g., Bos et al., 2001); however, since the relevant studies varied considerably in their research objectives and procedures it is difficult to distill which components of teacher preparation and professional development influenced the teachers' beliefs. General and special education teachers' attitudes and beliefs about SWDs also seem to depend on their context, the types of students they are serving, and teachers' individual characteristics. Findings from a handful of studies suggest that when general education teachers work in supportive environments, that is, where there is support from other teachers or the administration and professional development

focused on SWDs, they are more likely to indicate a willingness to serve SWDs in their classroom (e.g., DeSimone & Parmer, 2006). Finally, both general and special education teachers are more likely to see the general education classroom as an effective placement when SWDs have less challenging needs (Scruggs & Mastropieri, 1996).

Taken together, findings from these studies suggest that teachers' beliefs matter in educating SWDs; yet, as a field, we have considerable work to do in this area and many conceptual and methodological challenges to overcome. The establishment of a robust line of research seems warranted, and even urgent, considering the role that beliefs about working with students with disabilities seems to play in effective teaching (Jordan et al., 2010) and the role that effective teaching in turn plays in the achievement of students (Gordon, Kane, & Staiger, 2006).

Challenges

The literature on teachers' beliefs about inclusion and SWDs presents several challenges to interpretation. The first, a fundamental problem, is where to draw the line on what is included in the term beliefs and what is not. Definitions of beliefs in the studies included a variety of constructs that may or may not be similar, such as: attitudes, feelings, knowledge, and thoughts. Second, the concept of inclusion varies across settings. Inclusion is not a clearly defined approach and is manifested differently in different schools and for individual students. SWDs may be included for part of the day, for particular subjects, or even just physically in the same room while receiving different instruction from a different teacher. Inclusion can also mean full participation in the general education setting, with varying levels of support for individual students and/or teachers. Third, SWDs are not a homogeneous group. There are different types of disabilities and even within a disability category students can vary considerably in terms of academic and behavioral needs. Teachers' beliefs about inclusion and SWDs vary according to the type and severity of the student's disability. The heterogeneous nature of this population makes it difficult to define the learning and behavior needs of the students teachers are being asked to consider when describing their beliefs.

Fourth, reliance on surveys to examine teachers' beliefs may have prevented researchers from acquiring more in-depth knowledge about beliefs and how beliefs were influenced by context and teacher characteristics. Surveys require respondents to choose among predetermined answers that may or may not reflect teachers' beliefs accurately or adequately. An emerging concern in this area of research is the need to understand the effects of context and teachers' characteristics on beliefs and practices (Brownell & Pajares, 1999; Soodak, Podell, & Lehman, 1998). Sometimes, researchers could only assume that context led to differences between special and general education teachers' beliefs (e.g., McHatton & Parker, 2013). Clearly, more research is needed if we are to understand more clearly how context and teacher characteristics work in concert with beliefs to predict teachers' decisions and practices when educating SWDs.

Finally, with a few exceptions such as the work of Jordan and Stanovich and the self-efficacy work, no coherent lines of research regarding teachers' beliefs about inclusion and SWDs can be traced. The literature base consists of idiosyncratic

studies that lack reference to common theoretical frameworks that could help shape future studies and syntheses of findings.

Future Research

Research on general and special education teachers' beliefs about SWDs needs to become a serious area of study if researchers in special education are to better understand the different types of beliefs teachers hold about SWDs and the ways those beliefs matter. For instance, beliefs about the particular subject or content area have proven to be important for teacher practice studies in general education; however, few researchers sought to understand how subject area beliefs of general or special education teachers might be important for their practice related to SWDs (e.g., Berry, 2006). Researchers have found subject-specific beliefs to be tightly interconnected to teachers' practice in general (Graham, Harris, MacArthur & Fink, 2002; Stipek, Givven, Salmon & MacGyvers, 2001; Yerrick, Parke & Nugent, 1997), and it is possible that these beliefs also undergird teachers' thinking about the kinds of supports they provide for SWDs. Subject-specific beliefs may be even more important for secondary teachers who tend to specialize in one or two subjects and are an important teacher factor that cannot be ignored.

Researchers also need to understand more about teachers' beliefs about how students with different disabilities learn and how teachers come to understand their strengths and needs as learners individually and collectively. It will also be necessary to uncover what teachers believe is their individual and collective responsibility in teaching these students. Teachers' beliefs about how students learn and their responsibility for helping them learn likely interact with what teachers believe about teaching subject matter and how they see themselves as teachers—understanding these sets of beliefs will be important to teacher educators who will need to recognize these beliefs and address them in preservice and professional development efforts.

The lack of studies on teachers' beliefs about SWDs who were culturally and linguistically diverse (CLD) was a major omission in the special education research. Historically, children with diverse CLD backgrounds have been and continue to be overrepresented in special education (Ford, 2012) and many teachers feel they are not adequately prepared to teach CLD learners (Utley, Obiakor, & Bakken, 2011). Better identification of teachers' views about students' cultural and linguistic backgrounds may help teacher educators figure out how to support general and special education teachers in becoming more knowledgeable about the unique characteristics of CLD SWDs and enable them to be better equipped to address biases (Garcia & Ortiz, 2008).

Jordan and Stanovich's research along with a few isolated studies in this review (Allinder, 1995; Berry, 2006; Podell & Soodak, 1993; Soodak, Podell, & Lehman, 1998) demonstrated relationships among teachers' beliefs about disability, self-efficacy, instructional practices and decisions to refer SWDs to special education. We know little though about how other types of beliefs influence practice and if beliefs change depending on the content being taught, how that content is structured, and how beliefs are measured. Improved assessment of beliefs shaping general and special education teachers' practice seems a necessary step in helping to improve

support provided for included SWDs. Teachers' own explanations of their beliefs and practices and their ideas on how what they do is linked to what they believe, in the contexts they inhabit, with the real students they have is essential for understanding the relationship between teachers' beliefs and practices. An obvious next step in linking beliefs to practices is research that provides rich, multilayered descriptions of ways teachers' many beliefs are related to specific practices for supporting SWDs within the general education classroom.

Many studies used surveys and scales to gather information on teachers' beliefs. Although surveys can be useful instruments for collecting information about teachers' beliefs, their construction should be based on well-developed theories of how beliefs function in teachers' decision making, classroom practice, and so on. The Stanovich and Jordan studies and self-efficacy studies relied on important theories about the role beliefs play in teachers' thinking and actions; thus, these studies tended to be some of the more fruitful ones. Using theoretical frameworks to design future survey studies of beliefs would seem like an important next step in improving quantitative research in this area.

There is also need for high-quality qualitative research that could support development of instruments for understanding and measuring beliefs. Qualitative research can play an important role in revealing teachers' beliefs—about content, curriculum, teaching and learning, and their own roles and responsibilities—as they relate to students with different types of disabilities and can contribute to the generation of theory on how beliefs are both interrelated and related to practice. Qualitative research is also well suited for enhancing our understandings of the role context plays in teachers' beliefs about SWDs, research that we sorely need.

Finally, we need to improve our understanding of the role teachers' beliefs play in efforts to improve teachers' instructional practice and how beliefs that interfere with teacher learning and implementation of effective instruction for SWDs might best be addressed. Our field has developed an extensive knowledge base about effective interventions and assessments for SWDs. If teachers' beliefs interfere with their ability to learn about and use the knowledge base we have amassed, then the education of SWDs is likely to be compromised.

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