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**Teachers' motivation and emotion during professional development:
Antecedents, concomitants, and consequences**

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**Teachers' motivation and emotion during professional development:
Antecedents, concomitants, and consequences**

by

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Dedication

This dissertation is dedicated to my wife and children.

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Any acknowledgements must begin with my wife, Erin. While we have known and loved each other since we were young (16!), we have grown together and taken care of each other. Erin has intellectually challenged me, pushed me out of my comfort zone, and helped me see through my commitments – one of them being this project. She has taught me to take better care of myself, introducing me to self-compassion and the work of Kristen Neff and others, and helped me see the “big picture” when I was consumed by anxiety. She has been a consummate mother to our children, embracing the chaos and joy of motherhood wholeheartedly. She also patiently listened as I became more versed in educational psychology and continuously shared my “knowledge” and its application to childrearing with her. There is absolutely and unequivocally no possible way that this dissertation could have finished without her support and guidance.

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questions rather than the other way around. He also helped me understand how to be critical of work without disparaging it. Finally, Paul Schutz supported this work intellectually by contributing a robust base of research and thinking about teachers' emotional experiences. The feedback that I have received from my committee improved this project immensely and helped ensure its success.

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Finally, my two children have supported me in this work. They have reminded me that joy is inherent to the human condition and that emotion and motivation can be rarely boiled down to an equation. I hope that the things I have learned while at UT will help me be a warm and loving father to the two of them and to our little baby girl, due in April.

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David J. Osman, Ph.D.

The University of Texas at Austin, 2017

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Professional development (PD) opportunities are offered to teachers as means for them to develop their knowledge and teaching practices, with the hope of improved learning outcomes for students. However, PD experiences often do not improve teacher knowledge or lead to changed teacher practices. Research exploring *how* teachers interact with professional development can serve as a powerful tool and help to outline further the landscape of professional development. Specifically, understanding the intersections of motivation, emotion, and teacher learning may inform our understanding of why teachers do or do not implement what they learn in PD and contribute to theories about the motivation-emotion-learning connection.

Theoretical frameworks influencing this work include Expectancy-Value theory of motivation (Eccles et al., 1983), with the idea that the theory may help with explaining teachers' motivation during PD by way of teachers' expectancies for successful implementation, value for implementing, and perceived costs of implementing influence

their intentions to implement what they learned in PD. In addition to motivation, this study considers teachers' emotional experiences during professional development. Emotion theories, as formulated by Pekrun (2006) and Fredrickson (2001), frame emotions as the product of cognitions, and emotions as antecedents to future cognition. In this way, emotions can support or hinder teachers' learning during PD. As teaching is an emotionally laden profession (Hargreaves, 1998), the consequences of teachers' emotions during PD are especially important to understand why and how teachers' learn and implement professional development.

In this descriptive study, I measured the antecedents and consequences of teachers' motivational and emotional experiences during PD. Educator participants (n = 673) were sampled from 64 summer professional development experiences. Participants completed two questionnaires, one immediately following the summer PD experience and a second in the following fall semester. Data were analyzed using hierarchical linear modeling. Results indicated that participants' motivation to implement what they had learned in PD and the degree to which they had experienced pleasant affect during PD predicted their intentions to implement what they had learned. Participants' motivation to implement was also predicted by their teaching self-efficacy. Implications for research and practitioners are discussed.

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Chapter One: Introduction

Teachers are fundamental figures in students' lives. A great teacher can transform students' motivation, their knowledge, and even their identity. Because teachers are so vital to students' academic success, and because what students need to learn continues to change even as they themselves change in a world that continues to evolve, it is critical that teachers continue their on-the-job learning and professional growth. Increasingly, researchers are exploring teachers' training experiences as a unique learning environment and investigating the antecedents and consequences of teachers' affective experiences associated with professional development (Emo, 2015; Gorozidis & Papaioannou, 2014; Hargreaves, 2011; Opfer & Pedder, 2011; van Veen & Slegers, 2006). Situated in this body of research, this dissertation explores teachers' motivation and emotional experiences during and following professional development experiences. This introductory chapter discusses the theoretical rationale that framed this dissertation before outlining the current study and dissertation structure.

THEORETICAL RATIONALE

Throughout their teaching careers, most teachers desire professional growth and therefore welcome on-the-job training (Putnam & Borko, 2000). Professional growth is necessary for less experienced teachers as they attempt to learn how to manage a classroom effectively while mastering the pedagogy necessary to create effective learning environments as well as continuing to learn the academic content knowledge they need for their teaching. Experienced teachers who are masterful craftspeople in the classroom

also require professional development. Student needs are ever-changing, because cultures evolve over time and demographic trends shift. Teachers must grow professionally to continue to meet their students' changing needs, as the average American student with whom a teacher interacts today is different from the average American student whom teachers taught 20 years ago. Expectations for teachers also evolve over time, and teachers require professional development to meet these changing expectations. Policy makers can alter expectations for curricula and instruction, as with the No Child Left Behind law and the implementation of the Common Core State Standards (Long, 2014). Ever-changing educational trends can also change expectations of teachers. The field of education is never static. New research and ideas alter what the leaders in the field think are best for students. For example, teachers are increasingly asked to implement social and emotional learning into their classrooms, a topic that was rarely broached in teacher education programs 10 years ago. Finally, like the progressive problem-solvers described by Bereiter and Scardamalia (1993), many teachers have a personal desire for professional growth and development. These teachers consistently identify new problems that need to be solved in their classrooms. The process of continually identifying new, previously unseen problems and solving them is central to many teachers' professional growth.

Although teachers informally learn through their daily teaching practice (Calderhead, 1996; Evans, 2014; Spillane, Reiser, & Reimer, 2002), formal professional development opportunities also support teachers' professional growth. Almost all teachers attend some sort of in-service training each year, traditionally in the form of a workshop (U.S. Department of Education, 2012). School leaders put together

professional development (PD) experiences because they believe teachers' participation in PD will lead to improving their teaching skills and in turn, positively influence students (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). Because of this, professional development is often at the crux of educational reform efforts at the campus, district, state, and national levels. This was the case with No Child Left Behind, Race to the Top, and other major reform efforts instituted at the national level (Long, 2014; Smith & Kovacs, 2011). In addition, campus principals are increasingly expected to be instructional leaders, providing trainings and other forms of professional development to teachers (e.g., instructional coaching; Osborn-Lampkin, Folsom, & Herrington, 2015). Often, however, participating in PD is a painful experience for teachers (Hargreaves, 2011; Saunders, 2013). The dominant narratives surrounding professional development experiences are that PDs are largely a waste of time, rarely addressing teachers' true needs (Nir & Bogler, 2008). Yet, professional development continues to be an important part of teachers' professional lives.

Professional development experiences are unique learning environments for teachers. During professional development, teachers play the role of students. They are expected to learn, and they expect to learn. However, teachers interact with the PD learning environment differently than do students in interacting with the classroom environment. For instance, during a PD, teachers are less restricted by hierarchical systems of control that regulate much of students' behavior. A PD facilitator (i.e., the trainer) cannot lean on the same external motivators that K-12 teachers do, such as grades or discipline marks. Instead, facilitators often focus on the utility that the training may have for teachers' students. Professional development providers intuitively understand

the differences between classroom environments and professional development environments, and attempt to design PD recognizing its distinctive features as a learning environment. For instance, in their book, *Motivating and Inspiring Teachers*, Whitaker, Whitaker, and Lumpa (2013) recommended introducing new ideas in small, easy to process chunks, systematically organized in a step-by-step manner. In a similar manner, Knight (2011) recommended taking a partnership approach in which PD facilitators collaborate with teachers to identify their specific needs and then provide targeted and relevant PD. Although these professional development experts have clearly considered teacher motivation when recommending how to design PDs, they have not often explicitly tied their work to traditional motivational theories, as outlined by educational psychologists.

I approach this research from a practitioner perspective and from the perspective of an educational psychologist. As a former teacher, instructional coach, and professional development facilitator, I have regularly participated in professional development experiences over the course of 10 years. These experiences guide me to believe that teachers' experiences during professional development, especially their motivation and emotions, have lasting impacts on their classroom practice. As an educational psychologist, I recognize the educational theories that help explain motivated behavior in classroom settings. The intersection of these two perspectives was especially salient for me when participating in a research study as a professional development facilitator (Osman et al., 2016). As the PD facilitator, I found that teachers' emotional and motivational experiences during the professional development were hidden to me, and I moved forward through the training naïvely. However, through my participation in

analyzing interviews and survey data following the PD, I came to realize that teachers had many emotional experiences, exposing several critical incidents throughout the PD that influenced their motivation and emotions. Even as an educational psychologist, aware of the power of motivation and emotion on learning, I had found it difficult to implement professional development that acknowledges motivation and emotion and fosters positive affective experiences. This difficulty can, in part, be explained by the lack of research on teachers' affective experiences during professional development as the intersection of psychological theories of motivation, emotions, and learning, and teachers' professional development experiences (Hargreaves, 2011; Opfer & Pedder, 2011).

Theory and research on motivation and emotion, established and developed with students in classrooms, can serve as a guide for research on teachers in professional development experiences (Opfer & Pedder, 2011; Saunders, 2013; Schutz, Aultman, & Williams-Johnson, 2009). Research on teachers' motivation and emotions in professional development indicates that teachers' motivation and emotions do influence their learning during professional development, their desires to implement what was learned, and their actual implementation afterwards (Saunders, 2013; Turner, Waugh, Summers, & Grove, 2009).

It can be burdensome for many teachers to change their teaching practices after a professional development, as such change can involve a long and difficult process (Hall & Hord, 2006; Opfer & Pedder, 2011). Some educational researchers have even posited that reasonably complex professional change typically takes three to five years to be fully implemented and institutionalized into a teacher's practice (Fullan, 2001; Hall & Hord,

2006). Therefore, it is also important to consider teachers' motivational states *following* a professional development experience. As teachers leave a professional development experience, and they consider the difficulties associated with implementing what they have learned, one might think that their motivational states would have a direct impact on their choice to implement (or to not), their persistence in the face of difficulties, and their perceptions of the cost of implementation.

Expectancy-value theory may be a particularly relevant motivation theory to understand teachers' motivational states following PD. In this theory, individuals are motivated when they expect that they can complete the task (e.g., "*I think I can do it.*"), they value the task (e.g., "*I know why I should do it.*"), and they do not believe the costs are too great. A stronger understanding of teachers' expectancies, values, and perceived costs following professional development experiences might enable professional developers to develop PDs that support rather than hinder teachers' motivational states. In this study, I sought to elucidate the relationships among several possible antecedents to teachers' motivational states, while also exploring the implementation-related consequences of teachers' motivational states.

Teachers' emotional experiences during professional development are an especially interesting antecedent and consequence of teachers' motivation. Teaching is an emotional profession, yet professional developers often attempt to minimize the role of emotions in PD (Hargreaves, 1997, 2011). Teachers' emotional experiences during professional development may influence their motivation (and may, in turn, be influenced by their motivation), ultimately influencing what they choose to do when teaching in their classrooms. Teachers' positive emotional experiences in professional development may

provide a wellspring of support and resilience that teachers may rely on when implementing (Fredrickson, 2001). Most importantly, however, teachers' emotional experiences during professional development may be related to their well-being and their sense of job satisfaction (Fredrickson, 2013). Yet, professional development experiences are a particularly stress and anxiety-ridden experience for teachers (Lee, Huang, Law, & Wang, 2013; Osman et al., 2016; van Veen & Slegers, 2006). Continued research on teachers' emotional experiences may help professional development providers foster more supportive and pleasant environments for teachers.

THE CURRENT STUDY

This study was situated at the intersection of teachers' motivation and emotion during professional development experiences. In a cross-sectional study, educators' ($n = 673$) experiences across several professional development experiences ($j = 64$) were measured. Participants' experiences were self-reported at two time points, immediately following the summer professional development experience and several months later during the fall semester. Multi-level modeling was used to analyze these data, as educators were nested in trainings. Analyses addressed three research questions: How is motivation associated with implementation? How are educators' emotions associated with implementation? What factors predict educators' motivation to implement a PD?

ORGANIZATION OF THIS DISSERTATION

This dissertation is organized into five chapters, the first an introduction followed by review of relevant literature. Chapter 2 consists of a literature review examining

research on teachers' experiences; teachers' professional development experiences, their motivational experiences, and emotional experiences while at work. Chapter 3 provides an explanation of the research methods employed in this study, describing the participants, settings, instruments, procedures, and analysis plan. Chapter 4 then consists of the analyses results, organized by research question. Finally, Chapter 5 includes a discussion of the main findings, the limitations of the study, and implications for researchers and practitioners.

Chapter Two: Literature Review

Although professional development is common for teachers in the United States, the effectiveness of these trainings is mixed. Teachers often leave professional development experiences unmotivated to implement what was taught and unmotivated to change their practice. This is a significant problem, as many education reformers and school leaders depend on professional development opportunities to make change in schools.

More and more, researchers and practitioners are interested in the role of the teacher as a learner in professional development. Research on motivation and emotions in academic settings may have implications for teachers in professional development. This literature review provides an overview of research on professional development before considering research on motivation and emotion. Implications of motivation and emotion research for teachers in professional development are discussed throughout the chapter.

PROFESSIONAL DEVELOPMENT

This section provides a definition of professional development and a description of typical professional development experiences in practice before outlining the extant research on effective professional development and discussing how the relationships between contexts and teachers may vary across teachers.

Broadly defined, professional development can be “any activity that is intended partly or primarily to prepare paid staff members for improved performance in present or future roles” (Little, 1987, p. 491). Commonly, teachers refer to professional

development experiences as *trainings*, *professional developments*, or *PDs*. Professional development experiences are future-oriented in that they provide teachers knowledge or skills that might influence their teaching and learning in the future (Eran, 2012). For many teachers, the fundamental goal of professional development is to benefit students rather than themselves as teachers (Parise, Finkelstein, & Alterman, 2015).

Typical professional development experiences

Researchers and practitioners have conceptualized a “patchwork” of activities as professional development including structured in-service training sessions, co-teaching, observations, book clubs, and even a discussion in the hallway (Borko, 2004; Desimone, 2009; Wilson & Berne, 1999). Table 2.1 lists many of the activities that researchers have included under the label of *professional development*. In the United States, professional development experiences most often take the form of workshops or conferences but also often include teachers’ regular collaboration with other teachers, peer observations and instructional rounds (e.g., City, 2011), action research, attending college courses, presenting at conferences, or visiting other schools (Snyder & Dillow, 2015; Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009). Figure 2.1 shows the percentage of teachers from a nationally representative sample who participated in various professional development activities (U.S. Department of Education, 2012).

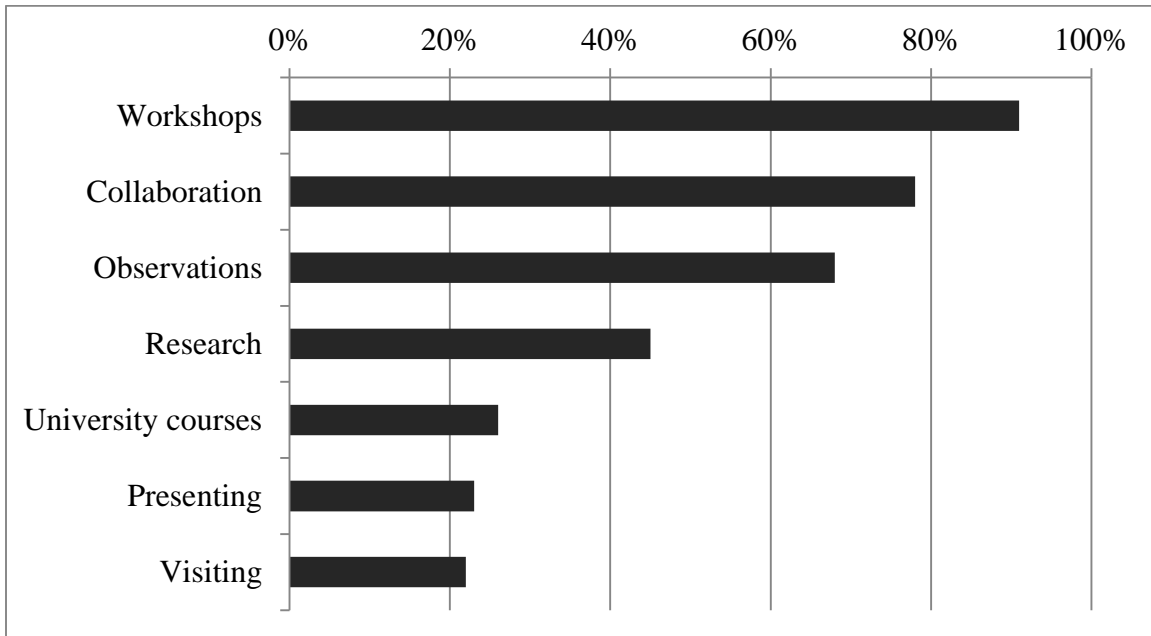
Table 2.1

Common Professional Development Experiences and Examples in Research

Professional development activity	Selected research
Action research	Ado (2013)
Book club/book study	Kooy (2006)
Co-reflecting on authentic artifacts	Ball & Cohen (1999)
Co-teaching	Rytivaara & Kershner (2012)
Coaching (instructional, peer)	Coburn & Woulfin (2012)
Collaboratively designing materials	Voogt et al. (2015)
Conferences	Li & Greenhow (2015)
Engaging with curriculum	Remillard (2005)
Engaging with student views	Messiou & Ainscow (2015)
In-service training (i.e., workshops)	Lydon & King (2009)
Instructional rounds	City (2011)
Involvement in campus improvement	Little (1993)
Mentoring	Stanulis, Little, & Wibbens (2012)
Online training	Ingvarson, Meiers, & Beavis (2005)
Professional learning communities	Lee, Zhang, & Yin (2011)
Reflecting on lessons	Osipova et al., (2011)
Summer institutes	McCutchen et al. (2002)
Social media (e.g., Twitter)	Li & Greenhow (2015)
Teacher networks/study groups	Greenleaf, Schoenbach, Cziko, & Mueller (2001)
Virtual learning communities	Cuthell (2002)

Figure 2.1

Percentage of teachers reporting participating in various professional development activities in the 2011-12 school year (U.S. Department of Education, 2012).

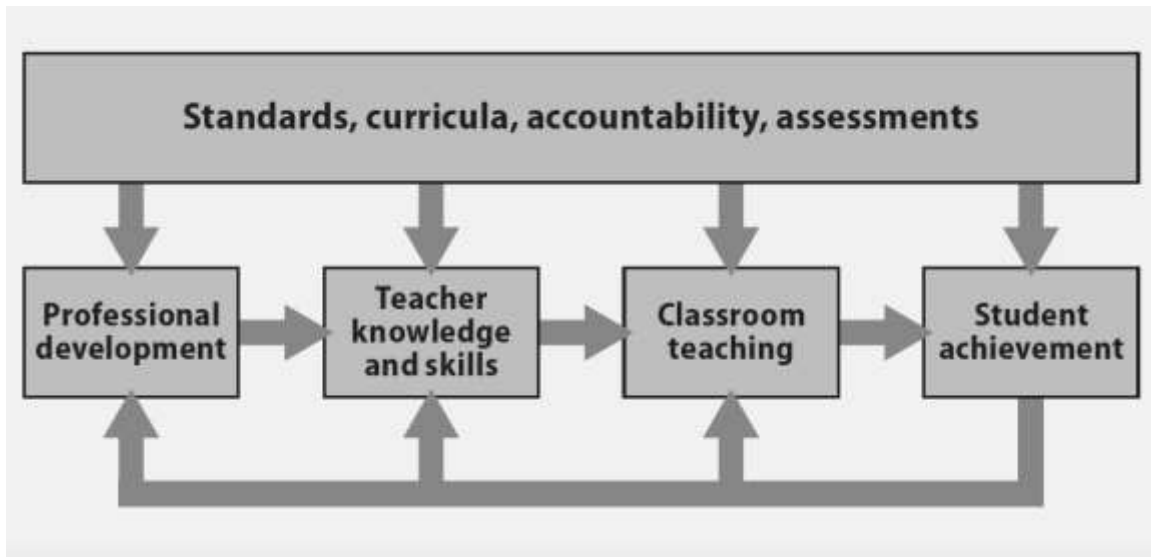


The use of professional development in schools increased exponentially between 2000 and 2010 as a response to the *No Child Left Behind* act (Long, 2014), and researchers estimate that U.S. public schools spend billions of dollars yearly on professional development (Birman et al., 2007; The New Teacher Project, 2015). One reason professional development is common in schools is that education leaders theorize that professional development drives positive change in schools. PD providers posit that professional development experiences improve teachers' knowledge and skills, which in turn improve teachers' classroom practices (i.e., implementation), which then induce positive changes in student outcomes (see Figure 2.2; Yoon et al., 2007). However, as the number of professional development opportunities has increased exponentially for

teachers since 2000, research on what characterizes effective professional development has not kept pace (Lawless & Pellegrino, 2007).

Figure 2.2

Model of the effects of professional development, from Yoon et al. (2007).



Research on professional development

There is growing interest in defining the characteristics and contexts of professional development experiences that most effectively induce change in teachers and improve outcomes for students (Desimone, 2009; Hill, Beisiegel, & Jacob, 2013; Jacobs, Burns, & Yendol-Hoppey, 2015). Although this line of research is dominated by descriptive and correlational research, some quasi-experimental and experimental work exists (Hill et al., 2013; see Yoon et al., 2007 for a review). Desimone (2009) reviewed a body of case study, correlational, quasi-experimental, and experimental research on the effects of professional development and found that at least five characteristics led to

effective professional development: content focus, active learning, coherence, duration, and collective participation. PDs with a *content focus* are motivated by the subject matter that teachers are teaching (e.g., early reading, Algebra II, 5th grade science) and purposeful in teaching how students acquire that specific knowledge. Trainings that include *active learning* involve pedagogical strategies that encourage teachers to participate in their learning experience (as opposed to sitting passively in a lecture). Examples of this type of PD are observation and feedback; analyzing and discussing student work with peers; and giving presentations (Desimone, 2011). *Coherent* trainings align with teachers' knowledge and beliefs and with existing reforms and policies in their districts and schools. Desimone (2009) also found that professional developments that were longer than 20 hours of training and lasted at least a semester (*duration*) were highly correlated with positive student outcomes. Finally, PD that encouraged *collective participation* by grouping teachers by common contexts (e.g., grade-level taught, subject taught) and by developing interactive learning communities were effective (Desimone, 2011).

This line of correlational research provides a solid foundation to guide practitioners as they develop PDs. However, research such as this, that focuses on the characteristics of professional development that are correlated with positive outcomes, is similar to process-product research conducted with students nearly 50 years ago (Opfer & Pedder, 2011; for reviews of process-product research see Brophy & Good, 1986, and Rosenshine & Stevens, 1986). The process-product approach was criticized for taking an additive approach to learning contexts, rather than exploring the complex systems involved in classrooms. In the same way, ensuring that a particular host of characteristics

exists in a professional development experience does not ensure that the PD will be successful. Recent research has indicated that some professional development experiences, which included the five characteristics identified by Desimone, were still largely ineffective (Arens et al., 2012; Bos et al., 2012; Garet et al., 2008; Garet et al., 2011; Santagata, Kersting, Givvin, & Stigler, 2011). There is evidence that the effects of professional development experiences are heterogeneous across individuals and contexts, and variance in effects exists across individuals at each level of transfer (i.e., each horizontal arrow in Figure 1; Gegenfurtner, 2011; Rijdt, Stes, van der Vleuten, & Dochy, 2013). It is also possible that teachers learn even when a PD does not meet all of Desimone's criteria (for example, a short PD focused on a pedagogical strategy; Opfer & Pedder, 2011).

As research on students has moved beyond process-product research, it is important for research on professional development to move toward understanding *why* and *how* contextual factors influence the effectiveness of professional development (Marsh, 1982; Goldsmith & Schifter, 2009). Understanding the ways contextual factors interact with how teachers take up professional development might help us look into the "black box" of professional development and elucidate why some professional development experiences are effective and why others are largely a waste of time (Opfer & Pedder, 2011). Understanding how individual teacher characteristics interact with professional development experiences and contexts is important to understanding this variance. We must consider that teachers are adult learners and that research on motivation, emotions, efficacy, and intentions has implications for teachers' learning and

behavior after professional development, including whether and how implementation of what was learned in PD occurs.

Teachers as adult learners

Professional development experiences are designed to be learning experiences for teachers. Schools can be considered achievement arenas in which attitudes and emotions about learning and instruction influence both students and teachers (Butler, 2007; Butler & Shibatz, 2008). This is especially true for teachers in professional development experiences, where teachers partially shed their roles as *teachers* and take on the guise of *learners* (Gravani, 2012; van Eekelen, Vermunt, & Boshuizen, 2006). As with all learning, teachers' learning is influenced by characteristics specific to the learner (e.g., knowledge, motivation, emotion) along with characteristics of the environment (Wlodkowski, 2008). For teachers, previous research indicates that prior knowledge and skills, beliefs and attitudes (Woolfolk Hoy, Davis, & Pape, 2006), motivation (Turner, Waugh, Summers, & Grove, 2006; van Eekelen et al., 2006), and emotions (Darby, 2008; Frenzel, 2014; Saunders, 2013) are especially important to their professional growth. Research on how teacher characteristics dynamically interact with professional development and result in change in their practice is growing (see Gegenfurtner, 2011; Rijdt et al., 2013), and research such as this is key to understanding how professional development works to foster positive change in teachers' classrooms.

Implementation of professional development

After participating in professional development, teachers make active choices in what to implement of what they have learned (Boyd & Boyd, 2005; Ellsworth, 2000; Zhao & Frank, 2003). When teachers implement a PD experience, they apply knowledge acquired in professional development to their teaching practice. Implementation may take the form of altered teaching practices or use of new curricular materials. For example, a teacher may implement a professional development on vocabulary by teaching words using a new vocabulary routine (i.e., teaching practices) or by choosing to teach different kinds of words (i.e., curriculum). Teachers' learning and professional growth are rarely linear in nature. More often, teachers' learning and growth are cyclical processes that occur in fits and starts, and develop unevenly across domains (Opfer & Pedder, 2011).

When teachers decide to implement what they have learned in a professional development training, they consider a host of factors, including their motivation to implement (estimations of the expectancy for success, their value of the tasks required, and the costs of engaging in these behaviors), their emotional experiences during the professional development experience and anticipated emotional experiences while implementing, their pedagogical and content knowledge, and their general teaching efficacy (Ajzen, 2011).

Future directions

Although research on professional development is growing, more research that considers teachers' affective experiences (i.e., their motivation and emotion) is needed (Opfer & Pedder, 2011; Saunders, 2013; Scott & Sutton, 2009). Such research may

support practitioners in designing professional development experiences that positively promote teachers' motivation and affect. Increased motivation and pleasant affect may also result in greater implementation of professional development and induce more well-being in teachers. The following sections provide a review of relevant literature and research on teachers' motivational and emotional experiences during professional development, along with work on general teaching efficacy. Throughout, I discuss the implications of these experiences on teachers' motivation to implement their learning by altering their classroom teaching.

TEACHER MOTIVATION

Motivation can loosely be defined as the will to undertake any goal-oriented behavior. In achievement-oriented environments such as schools, an individual's motivation can predict in large part the choices made, the effort put forth, persistence on tasks, and ultimately performance (Wigfield, Eccles, & Rodriguez, 1998). Although the body of research on student motivation is rich, research on teachers' motivation is less well developed (Richardson, Karabenick, & Watt, 2014). However, teachers' motivational experiences are important, especially during professional development. Because of this, research on students' motivation has implications for teachers (de Jesus & Lens, 2005).

There are dozens of approaches to explaining motivated behavior (e.g., self-determination theory, goal-orientation, attribution theory). Expectancy-Value Theory may provide an especially useful "umbrella construct" that captures and integrates many of these approaches to explaining motivated behavior (Barron & Hulleman, 2016, p.

505). Originally, expectancy-value theorists posited that motivated behavior can be largely explained by two broad factors, beliefs about competence and the ability to achieve an outcome (i.e., “*Can I do it?*”) and beliefs regarding the purposes for engaging in certain behaviors (i.e., “*Why do it?*”). Increasingly, some expectancy-value researchers believe that a third factor can be distinguished from expectancy and value: perceptions of cost (i.e., “*Is it worth it?*”?; Barron & Hulleman, 2015; Flake, Barron, Hulleman, McCoach, & Welsh, 2015). This section provides an overview of expectancy-value theory as posited by Eccles and other recent theorists, and includes a discussion of the implications of this motivational theory for teachers’ professional development.

Expectancy-value theory

Initially defined by Tolman (1932) and Lewin (1938), and later by Atkinson (1957), modern expectancy-value theory posits that goal-oriented behavior is directly influenced by expectancies for success and task values (Eccles et al., 1983; Eccles & Wigfield, 2002; Pekrun, 2006; Wigfield, Tonks, & Klauda, 2009). Research on children as young as 6 has suggested that students form distinct perceptions for expectancy and value within and across domains (such as math and science), such that a student might have a high expectancy for success and low value for tasks in math but not in science (Eccles & Wigfield, 1995; Eccles et al., 1983).

Expectancy-value theory and professional development

As applied to professional development, teachers appraise their expectancies beliefs for implementing what they are learning during professional development and

their values for doing so (van Eekelen et al., 2006). A teacher might expect success at learning successfully what a PD is about, yet not value its implementation. Alternately, a teacher might value the professional development but not know how to implement what she has learned and not expect success. Expectancy-value appraisals influence teachers' motivation during professional development experiences and afterwards, when attempting to change their teaching (i.e., during implementation).

Expectancy for success

Expectancy is a subjective evaluation of performance on a future task, and involves an individual's broader beliefs about ability and anticipated success on the future task (Wigfield et al., 1998). An individual's willingness to initiate a task is dependent on the individual's belief that s/he can successfully accomplish the task (i.e., *ability beliefs*). Concepts of self-efficacy and ability beliefs are directly related to an individual's task specific *expectancy beliefs* (Eccles & Wigfield, 2002). Although Eccles and colleagues originally posited that ability beliefs and expectancy beliefs were separate constructs, empirical research has indicated that individuals do not distinguish these two constructs (Eccles & Wigfield, 1995). In current views, most researchers blend the concepts into one factor, expectancy.

In achievement situations, belief that one can be successful on a task is a strong predictor of positive outcomes (Schunk, 1991; Zimmerman, Bandura, & Martinez-Pons, 1992). This is especially true for the initiation of motivated behavior. For example, Simpkins, Davis-Kean, and Eccles (2006) found that choice to enroll in higher-level math courses was largely predicted by students' evaluations of their expectancy for success in

those math courses. There is also evidence in various contexts that efficacy interventions (i.e., interventions that purposefully train participants to become more efficacious) lead to improved effort, persistence, and performance (Looby, De Young, & Earleywine, 2013; Scott-Sheldon, Terry, Carey, Garey, & Carey, 2012). Finally, expectancy beliefs in a particular domain are closely associated with value beliefs. For instance, Darby (2008) found that when teachers increased their expectancy beliefs when implementing new instructional practices, they came to value the practices and were excited and eager (thus showing signs of intrinsic value) to implement these new practices.

Teachers' expectancy for success and professional development

Expectancy beliefs are closely related to teachers' motivation to learn during a professional development experience and their motivation to implement that professional development later (Turner et al., 2009). Teachers who can envision successfully implementing what is learned during professional development may engage in professional development more deeply and attempt more new teaching techniques than do teachers with low ability beliefs (Thomson & Kaufmann, 2013). Three correlational studies found that teachers' expectancy for success was the greatest predictor of their implementation of new teaching strategies learned during PD (Abrami, Poulsen, & Chambers, 2004; Foley, 2011; Wozney, Venkatesh, & Abrami, 2006). Foley (2011) also found that teachers' expectancy for success was closely associated with the level of reported implementation, above and beyond contextual factors such as perceived school support and class size. Although these studies were correlational, making it impossible to infer the causal link or direction, it is possible that a teacher's ability belief – the idea that

I can do this – provides a motivational wellspring to draw from to overcome lack of support from campus leaders and large class sizes. In addition, there is evidence that professional development trainings in which teachers are able to practice, self-reflect, and plan – activities that might increase teachers’ ability beliefs and expectancies during PD – are closely associated with PD implementation (Avalos, 2011; Bell & Gilbert, 1994; Penuel, Fishman, Yamaguchi, & Gallagher, 2007). However, more research is needed to establish the explicit relationship between teachers’ expectancies for success and experiences during and after professional development.

Values

Although the relationship between expectancy for success and task value is usually positive (Wigfield et al., 1998), individuals’ value for a task is understood as a separate but related construct (Wigfield et al., 2009). Task values are subjective assessments of the importance of a task. Eccles and colleagues (1983) delineated task values as attainment values, intrinsic values, utility values, and cost values. Later, some expectancy-value researchers began to conceptualize cost as a separate construct (Barron & Hulleman, 2015).

Attainment value

Attainment value speaks to the value an individual assigns to a task because the task aligns with his or her identity. For instance, a student may see herself as a “good student” whose sense of identity is closely aligned with her desire to study for long hours before a test. As attainment value is rooted in sense of identity, it is influenced by

individuals' conceptualizations of their own race, ethnicity, and gender (Anderson & Ward, 2014). Students with high attainment value have been found to put forth more effort, have greater achievement, and persist more than those with low attainment value (Anderson & Ward, 2014; Cole, Bergin, & Whittaker, 2008; Penk & Schipolowski, 2015). However, Johnson and Sinatra (2014) reported that students who had high attainment value were less likely to engage in conceptual change while learning. They explained this result by hypothesizing that students with high attainment value focused their attention on details that supported their values and beliefs, ignoring those that did not.

Intrinsic value

Intrinsic value is the enjoyment individuals experience doing a task. Similar to interest (Hidi & Renninger, 2006) and intrinsic motivation (Ryan & Deci, 2000), intrinsic value can be induced when a person finds the task inherently meaningful or interesting. Hidi and Renninger (2006) posited that interest could develop over time, proceeding from a shallow situational interest to well-developed individual interest. For example, interest in a particular task can be triggered by the situation (e.g., by an exciting math video) or by the characteristics of an individual (e.g., a person who loves math). Completing tasks that have intrinsic value can lead to long periods of sustained motivated behavior and persistence in the face of distraction and failure (Gniewosz, Eccles, & Noack, 2015). However, there is some evidence that in achievement situations such as school, attainment value and utility value are better predictors of effort and achievement than

intrinsic value, especially when intrinsic value is based in triggered situational interest (Cole et al., 2008).

Utility value

Utility value is a person's perceptions of the usefulness of a particular task. Tasks with high utility value usually provide an individual with a way to meet goals and plans for the future. In this way, utility value relates closely to extrinsic motivation. There is evidence that utility value supports students' motivation to attend to academic content and engage more deeply (Jones, Johnson, & Campbell, 2015; Miller, Debacker, & Greene, 1999). Although the larger cultural milieu influences students' perceptions of utility value, contextual factors can also influence these perceptions (Shechter, Durik, Miyamoto, & Harackiewicz, 2011), and experimental studies reveal that utility value is malleable and can be manipulated. For instance, Hulleman, Godes, Hendricks, and Harackiewicz (2010) found that when students were asked to identify how specific academic content (such as math or psychology) may be useful to them in the future, they performed better on laboratory tasks and earned higher grades.

Utility value can take on many forms, focusing on the task's utility for others or on its utility for one's self. Tasks that are valuable to an individual because they provide utility for others (e.g., learning CPR) have *communal utility value* whereas tasks that provide utility for the self (e.g., earning a monetary reward) have *agentic utility value* (Brown, Smith, Thoman, Allen, & Muragishi, 2015; Pöhlmann, 2001). Tasks may have both communal and agentic utility value at the same time, or only one or the other, and are malleable in students (Diekman, Clark, Johnston, Brown, & Steinberg, 2011). The

distinction between communal and agentic utility value may be especially beneficial for understanding teachers' utility values as teachers' primary work is centered on providing value to their students.

Teachers' perceptions of value and professional development

Foley (2011) referred to teachers' values for professional development implementation as their "buy in" (p. 209). Teachers' valuing of what they are learning during professional development is influenced by contextual factors, such as campus culture and larger social values and norms (Jurasaitė-Harbison & Rex, 2010; Sato & Kleinsasser, 2004). A teacher might have high *attainment value* for a professional development experience because the training is congruent with his teaching philosophy and identity as an educator (Abrami et al., 2004; Bell & Gilbert, 1994; de Jesus & Lens, 2005; Emo, 2015; Grove, 2007). For instance, some teachers choose to teach because they want to make social change or make a difference in their community (Watt & Richardson, 2008). Professional development that aligns with these core values is likely to induce positive attitudes in teachers towards implementing that training (Bell & Gilbert, 1994; Donnell & Gettinger, 2015). Misalignment with attainment values can also influence teachers' motivation to implement professional development. Darby (2008) found that when teachers' professional beliefs and self-understandings (concepts closely related to teachers' attainment value) were challenged, teachers became fearful and were less likely to implement changes in their classrooms.

Research on teachers' *intrinsic value* to implement professional development indicates that some portion of teachers is intrinsically motivated during and after

professional development. Many teachers consider themselves “lifelong learners” who are driven by innate curiosity to engage in professional development (Cameron, Hulholland, & Branson, 2013; Grounauer, 1993; Swennen, Volman, & van Essen, 2008). Emo (2015) identified a group of teachers who sought out professional development because they enjoyed change and sought to avoid boredom. In addition, many teachers may be intrinsically motivated to engage in content-focused professional development. For instance, a history teacher might be genuinely excited to participate in professional development developing knowledge about the Civil War and Reconstruction because she has a strong interest in this time in history and enjoys learning more. A teacher might also inherently enjoy spending time in self-directed professional development on social media sites (e.g., Twitter) acquiring ideas for classroom organization (Visser, Evering, & Barrett, 2014).

Research indicates that teachers’ sense of *utility value* may be an especially strong motivator to implement professional development (Cameron et al., 2013; Emo, 2015; Steinert, et al., 2010). Many teachers see direct agentic utility value in participating in professional development. If teachers see direct benefits for their classroom instruction, they are more likely to be engaged during professional development and implement what they learn afterwards (Ritchie & Rigano, 2002). Cameron and colleagues (2013) found that teachers wished for PD to be “practical” and directly solve needs in teachers’ classroom. A teacher in a training may also see how the training will benefit her career, or help her improve her classroom management skills. Alternately, many teachers hold communal utility value for trainings, as they see how the training will assist them in helping their students, perhaps by improving students’ reading abilities. In qualitative

studies, Emo (2015) and Gay Van Duzor (2011) found that a desire to help students was one of the primary drivers for teachers when choosing to engage in professional learning opportunities. For instance, a science teacher in Gay Van Duzor's study reported, "I have seen my students get confused with the concept of density ... The exploration we did [in the professional development] would be perfect for the students." The relevance and usefulness (i.e., utility value) of the professional development experience for this teacher is communal, and is directly tied to her belief that it will help her students understand the concept of density.

Expectancy-value interaction

As originally theorized by Atkinson (1957), expectancies for success and values had a multiplicative effect on motivated behavior, as expressed by the equation $E \times V = M$; where E symbolizes expectancy beliefs; V, task value; and M, motivated behavior. However, modern Expectancy-Value Theory as examined by Eccles and colleagues has largely considered the *additive effects* of expectancies and values on motivation (Eccles et al., 1983; Eccles & Wigfield, 2002). In this way, researchers have examined how expectancies and values uniquely predicted motivated behavior. Recently, some researchers have returned to consider the multiplicative effects of expectancies and values on motivation. This *synergistic* view considers that as expectancies and values increase they produce stronger achievement-related effects (Trautwein, Marsh, Nagengast, Lüdtke, Nagy, & Jonkmann, 2012). The multiplicative effect also theorizes that low levels of expectancy and value together can lead to especially negative outcomes for learners (Nagengast, Trautwein, Kelvava, & Lüdtke, 2013). For teachers during

professional development, this multiplicative effect may be similar to what van Eeken and colleagues (2006) found in teachers “eager to learn” in professional development. These teachers believed that they had control over implementing what they learned in professional development (expectancy beliefs) and therefore saw value in learning during professional development. By contrast, another cluster of teachers, “not seeing why there’s a need to learn,” did not value the content of the professional development, as they believed that change in their classrooms would not result in positive outcomes (low expectancies for success). In other words, for these teachers, expectancy beliefs interacted with value beliefs to amplify the effects of expectancies and values on motivated behavior (Cameron et al., 2013).

Cost

Cost is defined as the negative appraisals of what is invested, required, or that must be “given up” in order to complete a task (Flake et al., 2015; Wigfield et al., 2009). Initially, cost was theorized as a sub-component of value (Eccles et al., 1983; Eccles & Wigfield, 1995). However, expectancy-value research has increasingly posited that cost should stand alone as its own factor alongside expectancy and value (Barron & Hulleman, 2015; Conley, 2012; Flake et al., 2015; Kosovich, Hulleman, Barron, & Getty, 2014; Trautwein et al., 2012). It is unknown if cost serves as a lens by which individuals perceive expectancy and value (serving as an antecedent), or if cost mediates (or moderates) the effect of expectancy and value on motivated behavior (Barron & Hulleman, 2015). For example, individuals’ perceptions of task effort (costs) may directly influence their perceptions of task difficulty and ability beliefs (expectancies). In

this example, cost may serve as an antecedent to expectancy. However, it is also possible that perceived cost is a byproduct of expectancy and value. For example, if one sees value in a task and expects success, one may not perceive any costs, despite the fact that costs actually exist. In this example, cost may be a mediator of value and motivated behavior (or may be spuriously related to motivation).

Perceived costs can be categorized as those associated with *effort*, *emotional costs*, and the *loss of valued alternatives* (Eccles et al., 1983; Barron & Hulleman, 2015). Anticipated effort influences perceptions of cost, including evaluations of how much time a task will take, task difficulty, and evaluation of other tangible costs (i.e., resources). Individuals may also consider the psychological costs of tasks (Battle & Wigfield, 2003), especially those that may be emotionally taxing, such as teaching. For example, a teacher may believe that implementing a new pedagogical technique may be stressful and emotionally exhausting. Cost is especially important when individuals make choices, as all choices involve costs (i.e., by choosing one thing one usually gives up another). For example, a teacher might have to sacrifice time with his family in order to plan and prepare to conduct a novel teaching task the next day. In this way, the loss of valued alternatives (such as time with family) can increase the perceived cost of a task. If perceived costs are too high then motivated behavior is unlikely, even when a task is valued and success is expected.

Teachers' perceptions of cost and professional development

Teachers frequently mention cost as justification for not implementing professional development (Cameron et al., 2013; Christesen & Turner, 2014; Kwakman,

2003). Implementing new professional development programs can be difficult, stressful, and cause the loss of valued alternatives. Teachers often cite the difficulty and time-consuming nature of developing new lesson plans and implementing new teaching strategies (Abrami et al., 2004; Gallo, 2016). Perceptions of cost can overwhelm expectancies and value, resulting in amotivated behavior. For example, a teacher participant in Cameron et al's (2013) study, reported:

You come back with all the grandiose plans about how you're going to implement all these new things you've just been learning about and you come back to the cold hard world and you think, "Oh, it's just too hard. It's not worth it." So I just do the things I've been doing because that's my pattern, my routine. It's a survival thing. (Teacher E3)

When Teacher E3 reports that her lack of implementation is, in part, due to her belief that "It's a survival thing," one can see that implementation can also be emotionally taxing for some teachers (Cameron et al., 2013; Reio, 2005; Schmidt & Datnow, 2005). Schmidt and Datnow (2005) found that teachers who felt that they did not fit the "mold" of a professional development perceived increased emotional costs, such as stress, worry, guilt, and anxiety (p. 958). Teachers in Reio's 2005 study reported that the uncertainty associated with change was especially emotionally taxing. In addition, the machinations of professional development can be emotionally taxing for teachers. Being observed by others can be stressful, as can attendance at PD (Schmidt & Datnow, 2005). In addition, implementing new ideas and lesson plans during classroom instruction involves not teaching old ideas and lesson plans, and these losses can be difficult for some teachers. In a group of Chinese teachers, Lee and Yin (2011) found that introduction of a new textbook curriculum, and the loss of the prior curriculum, resulted in teachers feeling a loss of control and increased emotional costs. It is possible that, for

teachers, the perceived loss of valued alternatives is especially harmful when this loss is due to hierarchical pressure to change (Lee & Yin, 2011).

The direct relationship between teachers' perceived costs and implementation is not clear, however. Abrami et al. (2004) and Foley (2011) found that the effects of expectancy and task value overwhelmed the effects of cost, as cost was *not* a meaningful predictor of teachers' implementation above and beyond expectancy and value. Implementation will typically have costs for teachers and teachers' motivational states may not have real effects on these actual costs. However, it is possible that for teachers, the *perceptions* of cost are simply byproducts of low expectancy or value for implementation. When a teacher does not believe he can implement or does not value implementing a newly learned teaching practice, the costs of implementation are particularly salient. When a teacher believes she can implement and thinks implementation is important, those real costs are simply not perceived. More research needs to be done on the relationships between expectancy, value, and cost for teachers in the context of professional development.

In summary, expectancy-value theory can be understood as an umbrella construct to help frame teachers' motivation to implement professional development. Teachers consider their perceptions of expectancies, values, and cost when making decisions about implementing professional development. However, the precise nature of these relationships is unclear in theory (i.e., what is the role of cost). It is also unclear how expectancy-value research on students' motivation can be applied to teachers' motivation to implement PD. It is unclear from the extant research on teachers' expectancy, value, and cost whether one factor is particularly salient in predicting motivated behavior in

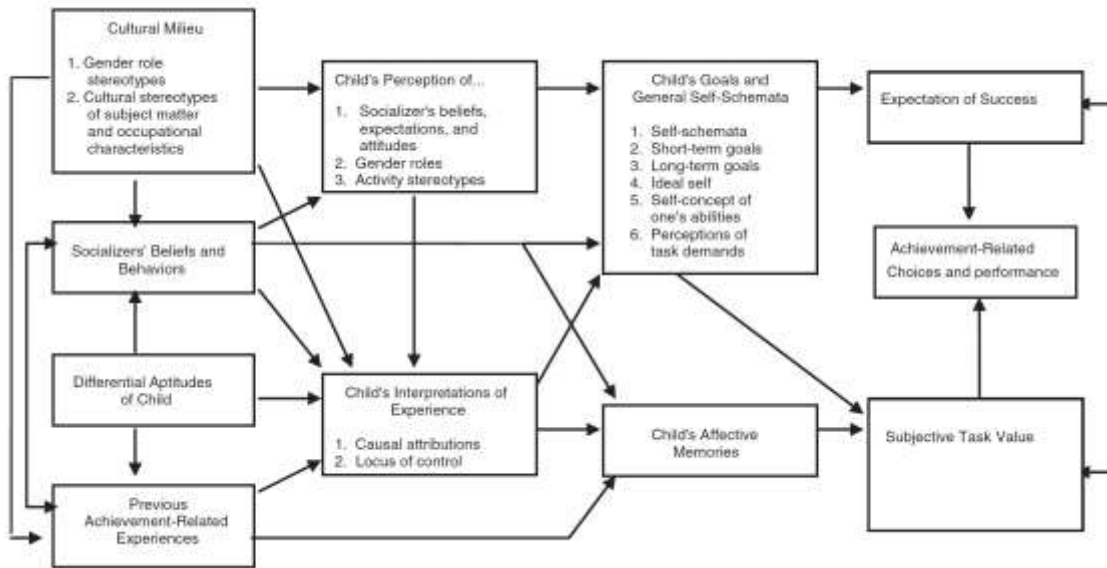
teachers. Although expectancy and value seem to have multiplicative effects in students, do these multiplicative effects exist in teachers? Because of these questions, further understanding of how these variables interact in this unique context has implications for motivational theory. Having reviewed some of the work on expectancy-value theory and discussing the research applying this theory to teachers' professional development, I now move to review research outlining how expectancies, values, and costs develop – over time, and in the moment.

Development of expectancies, values, and costs

Expectancy, value, and cost are closely related constructs as are their antecedents. Individuals develop their senses of expectancy, values, and cost in complex ways. Broadly, these constructs are influenced by psychological, social, and cultural factors. Wigfield et al. (2009) developed an elaborate figure to help explain this development (Figure 2.3).

Figure 2.3

Expectancy-value model for learning from Wigfield et al. (2009).



There is research indicating that expectancies for success in a particular domain (e.g., math) typically develop prior to values in that domain – *we value what we do well* (Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002). The relationship between expectancy and value also strengthens over time. It is unclear if this strengthening is due to increased experience or developmental changes that occur in children as they age, or whether expectancy and value have reciprocal effects on each other (Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006). Wigfield and colleagues (2009) posited that the strengthening of the relationship between expectancy and value over time may be due to the concurrent influence of past experiences on expectancies and values. For instance, a teachers' past experience with implementing a training and her attributions of causality (i.e., her beliefs about if it was successful and why it was successful) will influence her perceptions about her efficacy to implement similar trainings along with the value and demands of doing so.

Affective memories are also associated with past experiences and can serve to magnify or diminish the salience of memories. The qualitative nature and strength of affective memories can play a prominent role in an individual's sense of expectancies and values (Schutz, Crowder, & White, 2001). For example, a teacher may have had a particularly joyful moment with a student while implementing a new practice. The affective memory of this joyful moment may largely subsume the difficulties associated with implementing and serve to build up the teacher's sense of utility and attainment value for implementing.

Expectancies and values are influenced by larger socio-historical contexts and the cultural milieu (Eccles & Wigfield, 2002). Cultural attitudes and stereotypes influence perceptions of identity, abilities, and values. For instance, teachers in the United States are influenced by the larger cultural milieu surrounding education, indicating teachers are overworked, undervalued, and increasingly pressured by standardized exams (Saunders, Parsons, Mwavita, & Thomas, 2015). This cultural milieu can influence their efficacy beliefs along with their value and persistence in the profession (Klassen, Al-Dhafri, Hannok, & Betts, 2011). Cultural milieu can also be more localized. In the contexts of schools, Dimmock (2014) noted that teachers' practice (and motivation to implement or not) are especially influenced by the social milieu of the local school. Important colleagues, norms of practice, and campus climate can influence teachers' values and even their expectancies for success when implementing new ideas (Dimmock, 2014; Saunders et al., 2015).

Antecedents of teachers' motivation

Four particularly salient antecedents for teachers' motivation to implement a professional development are their pedagogical knowledge, content knowledge, perceptions of teaching efficacy, and their emotional experiences during professional development.

Pedagogical knowledge

A teacher's pedagogical knowledge, knowledge of teaching practices and techniques, appears to be a critical antecedent to her expectancies and values during professional development (Gay Van Duzor, 2011; Tschannen-Moran & Chen, 2014). Pedagogical knowledge, like other forms of knowledge, is topic specific. For example, a teacher might have a deep understanding of teaching reading and the key strategies to teach reading effectively, while having little understanding of how to teach computer programming. Teachers who have knowledge of a particular topic are more likely to feel efficacious about implementing professional development about that topic, perhaps because they have already implemented some of the practices in their classrooms (Gay Van Duzor, 2011). Teachers who have more pedagogical knowledge about a particular topic may also be able to clarify more saliently the value, particularly the utility value, of implementing professional development about the topic.

Content knowledge

During professional development experiences, teachers learn new teaching strategies (i.e., pedagogical knowledge), but they often also acquire academic content

knowledge. Gay Van Duzor (2011) found that gains in academic content knowledge can be particularly useful in increasing teachers' motivation to implement a science training. Gay Van Duzor reported that, "teachers wanted their students to experience new insights and engaging experiments just as they did" (p. 369). The professional development revealed errors in their own content knowledge (science in this case), and they were motivated to return to their classrooms and clarify the possible misconceptions that students might also have had.

Sense of teaching efficacy

As defined by Tschannen-Moran and Woolfolk Hoy (2001), "a teacher's efficacy belief is a judgment of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated" (p. 783). Teachers' self-efficacy beliefs can be understood as domain and task specific and in this way, as separate constructs (Klassen & Tze, 2014). Tschannen-Moran and Woolfolk Hoy (2001) conceptualized teacher efficacy across three major domains, efficacy for instructional strategies, efficacy for classroom management, and efficacy for student engagement. These domains of teacher efficacy are separate, but correlated constructs (Klassen & Chiu, 2010). As an example, a teacher may feel efficacious when managing classroom behavior and motivating students, but lack efficacy when implementing a new reading curriculum. Teachers' efficacy beliefs about their general teaching abilities are correlated with positive student outcomes ($r = 0.28$; Klassen & Tze, 2014). Teachers' self-efficacy may play a large role in their general well-

being, burnout, and intentions to remain in the teaching profession (Aloe, Amo, & Shanahan, 2014; Skaalvik & Skaalvik, 2010).

Teachers' self-efficacy is often seen as an *outcome* from professional development experiences; as teachers learn more about a topic, they become more efficacious (Tschannen-Moran & McMaster, 2009). Teachers' self-efficacy beliefs are also an important antecedent to motivation during and following a professional development experience (Karabenick & Noda, 2004; Reed, 2009). General teaching self-efficacy beliefs can serve as guides for teachers, influencing task specific decisions to implement professional development, or not (Abrami et al., 2004; Fives & Buehl, 2012). In this way, teachers' self-efficacy beliefs about their general teaching abilities correlate with their motivation to implement a professional development (Reed, 2009) and their emotional experiences during professional development experiences (Reio, 2005; Lee & Yin, 2011). A teacher with a low sense of efficacy for managing classroom behavior may become incredibly stressed in a training on cooperative learning (a strategy that requires teachers to have masterful classroom management skills), and lack efficacy and value for implementing the training. The teacher may see the training as not relevant to him (e.g., *"I can't get the kids to be quiet as is, how can I expect them to work in groups?"*), or understand the value of the training (e.g., *"I don't see why kids need to talk in class anyway; they're always off task when they talk"*). Teachers with a strong sense of teaching efficacy are also less likely to believe that implementing new practices is especially difficult, and therefore the costs of implementing are lower for them. Importantly, teachers' general sense of teaching efficacy predicts the goals that teachers set for themselves and persistence when facing difficulties (Woolfolk Hoy, Davis, &

Pape, 2006). Implementing what is learned in a professional development experience can be quite difficult, and goal setting and persistence may be especially important when teachers attempt to implement (Abdal-Haqq, 1995).

Emotional experiences during professional development

Teachers' emotional and motivational experiences interact, recursively influencing each other. In academic situations, research indicates that pleasant emotions are positively associated with motivated behavior whereas unpleasant emotions are negatively related to motivated behavior (Frenzel & Stephens, 2013). Individuals in academic situations (such as professional development) who experience positive emotions tend to be more motivated. In any particular moment, however, unpleasant emotions (e.g., anger) or pleasant emotions (e.g., hope) can guide motivated behavior (Pekrun, 2006). In this way, emotions can serve as feedback loops with motivated behavior (Goetz & Bieg, 2016; Pekrun, 2006). Emotional experiences provide individuals with feedback on their actions and the environment, altering their motivation and behavior. The interaction of emotion and motivation can, therefore, have multiplicative effects on outcomes (Fredrickson, 2001).

Research on teachers' experiences during professional development also supports the existence of a positive emotion-motivation relationship (Jeffrey & Woods, 1996; Little & Bartlett, 2002). For instance, teachers' pleasant emotions are associated with valuing a professional development; whereas unpleasant emotions are related to lack of value (Lee & Yin 2011; Osman et al., 2016; van Veen & Slegers, 2006). In a qualitative study, Saunders (2013) found that some teachers' unpleasant emotional experiences

served to inhibit their motivation to implement. When thinking about future implementation, some teachers experienced stress, anxiety, and nervousness. These unpleasant emotions demotivated the teachers and prevented them from taking the risks necessary to implement new teaching techniques. Although there is evidence that teachers' motivational and emotional states are interactive and reciprocally influential, quantitative investigation of the multiplicative effects of motivation and emotion on teachers' implementation remains elusive.

Future directions

Research on motivation in academic settings has implications for teachers' motivational experiences following professional development. Expectancy-Value Theory, as understood by Eccles and Wigfield (2002) and later researchers (e.g., Barron & Hulleman, 2015), may be especially useful in describing teachers' motivation to implement. Although teachers' broader knowledge, efficacy, and emotions are related to their motivation to implement, the precise nature of these relationships with motivation remain unclear. Which of these factors is the best predictor of teachers' motivation, above and beyond the others? Understanding the role of teachers' emotional experiences in professional development may also be useful in understanding how teachers develop their motivation to implement what they have learned in PD.

TEACHERS' EMOTIONS

Emotions, although universally experienced, can be difficult to define and research. This section reviews possible definitions and taxonomies of emotions before

discussing three complimentary approaches to emotional experiences, socio-historical approaches, appraisal theories, and the broaden-and-build theory. Throughout the section, research is discussed about teachers, as are implications for teachers' experiences during professional development.

Emotions are typically shorter in duration and more intense in comparison to moods, which tend to be more diffusely experienced over longer periods of time (Fiedler & Beier, 2014). In addition, emotional experiences can be distinguished from broader constructs such as wellbeing and emotional exhaustion in teachers (Frenzel, 2014; Frenzel & Stephens, 2013; Goetz & Bieg, 2016). Emotions can be understood as episodic experiences that are both personally enacted and socially constructed (Schutz, DeCuir-Gunby, Williams-Johnson, 2016; Schutz, Hong, Cross, & Osbon, 2006).

Although many perspectives contribute to understandings of emotions (e.g., evolutionary, developmental, neurological; see Ekman, 2016; Frijda, 2000), socio-cognitive researchers have posited that emotional experiences are the result of cognitive appraisals (Frijda, 2008; Lazarus, 1991; Pekrun, 2006; Plutchick, 2001; Russell, 2003). Individuals physiologically experience and subjectively feel emotional episodes; in this way, emotions can be seen as personally enacted. Emotions are individually and socially constructed in that individuals' appraisals induce emotional experiences and are also influenced and defined by the socio-historical contexts in which individuals interact. For example, a teacher might feel anxious when participating in a professional development experience as she considers the difficulty of the task, but at the same time, she may feel strong hierarchical pressure from leaders at her campus to change her practice, and sense the larger socio-historical pressure to ensure that her students are successful. These

factors all contribute to her emotional appraisals and the induction of the physiological state of feeling stressed. This intense emotional experience may motivate her to act, or may cause her to disengage from the training and perhaps from the profession.

As this example illustrates, emotions are multifaceted and include several key components. Emotion researchers tend to focus on five key components: cognitive, affective, motivational, physiological, and expressive (Frijda, 2008; Moors, Ellsworth, Scherer, & Frijda, 2013). Emotions are cognitive in that they are rooted in cognitive appraisals of the environment; affective in that they involve subjective feelings; motivational in that they involve some sort of an action tendency or response; physiological (or somatic) in that they involve some sort of physiological response; and expressive in that they are outwardly shared with others in some way (Goetz & Bieg, 2016; Moors et al., 2013).

When researching emotions, it is important to clarify a few distinctions that past researchers have made. Emotions can be understood as *discrete* or *dimensional*. Discrete emotions can be described as specific and complex emotional experiences such as anger, frustration, boredom, hope, joy, and excitement (Shuman & Scherer, 2014). On the other hand, dimensional understandings of emotions tend to categorize affective experiences along continua according to their valence (pleasant vs. unpleasant) and arousal (activating vs. deactivating; Barrett, & Russell, 1998). Although the valence X arousal model is commonly used, researchers have also proposed other dimensional taxonomies of emotional experiences (e.g., Pekrun, 2006; Smith & Ellsworth, 1985). For example, for achievement situations (such as a professional development experience), Pekrun and colleagues (Pekrun, 2006; Pekrun & Perry, 2014) proposed a three dimensional

taxonomy for emotional experiences that included valence and arousal as before, and considered the temporal focus of the emotional experience. Pekrun considers an emotion that focuses on the activity itself (e.g., relaxation, boredom) to be *activity focused*, while considering emotions focused on academic outcomes to be *prospective* (e.g., hope, relief) or *retrospective* (e.g., pride, shame).

Antecedents and consequences of emotions

The emotions of teachers and students are “intricately woven into the fabric of classroom experiences” (Schutz et al., 2009, p. 195). Students’ emotional experiences are correlated with academic outcomes and positive wellbeing (Brackett & Rivers, 2014). Teachers’ pleasant emotional experiences while teaching are associated with positive student outcomes, including student achievement behavior (Frenzel, Goetz, Stephens, & Jacob, 2009; Hargreaves, 2000). Teachers’ emotional experiences are also associated with their own instructional effectiveness (i.e., teaching skills; Frenzel et al., 2009; Kunter, Tsai, Klusmann, Brunner, Krauss, & Baumert, 2008), and their positive relationships with students (Hargreaves, 1998, 2000; Intrator, 2006). Although the directionality of these relationships is unclear, it is clear that emotions play important roles in teachers’ and students’ lives.

What, then, induces emotional experiences in teachers and students? Is it that well-being and other positive outcomes induce pleasant emotions, that emotions lead to positive outcomes, or that the relationship is bidirectional, with emotions influencing outcomes and outcomes influencing emotions? Two approaches to emotions frame my understanding of the antecedents and consequences of emotional experiences. The first

approach is that emotional experiences are socially constructed (Schutz, 2014), and the second is that emotions are generated by individuals' cognitive appraisals of their environment (i.e., appraisal theories). The following sections describe research on these two approaches, and highlights two specific appraisal theories, Pekrun's (2006) control-value theory and Fredrickson's (2001) broaden and build theory. Finally, research on teachers' emotions and teachers' emotional experiences during professional development are discussed.

Social construction of emotions

Several researchers have posited that emotions are individually experienced and socially constructed (Schutz, 2014; Zembylas, 2003). Emotions are influenced by the larger socio-historical contexts in which they are experienced. In this way, emotions are relational and fundamentally tied to the contexts in which they are experienced. Although individuals experience emotions, the ways in which emotional experiences are interpreted and appraised are fundamentally tied to the shared context (Schutz et al., 2009). Cultural values and norms influence which experiences are identified as emotional and dictate emotional display rules (Schutz et al., 2009). Cultural influences exist across larger cultural systems (e.g., teaching culture of the United States or China), and across more localized cultural systems (e.g., two elementary schools in the same community). Consequently, larger cultural attitudes about professional development (e.g., that professional development is a waste of teachers' time), and teacher-administrator power relationships (e.g., that teachers are workers subservient to campus administrators/managers) influence how teachers emotionally interact with professional

development experiences. More local cultural attitudes also influence teachers' emotional experiences during professional development. For example, one elementary campus in a community may overtly create a culture where teachers are empowered to be in control of their own professional growth, whereas another in the same community may develop a hierarchical culture of compliance and fear surrounding professional development. Teachers on these hypothetical campuses, by and large, will have vastly different emotional experiences, despite both campuses existing in the same community.

These socio-historical contexts exist and build over time. For some teachers, after years (or decades!) of ineffective professional development in which campus administrators require attendance and demand compliance, an experienced teacher will “carry” cultural understandings and experiences with her as she enters a new professional development. These socio-historical understandings and experiences overtly and covertly influence her cognitive appraisals and her emotional experiences, existing as “scar tissue” for educators (Ackerman & Maslin-Ostrowski, 2004).

Socio-historical contexts also help define and reinforce which emotions are appropriate to experience and when it is appropriate to experience and display them (Zembylas, 2005; Beyer & Niño, 2001). In teachers for instance, it is commonly understood that it is most appropriate to experience pleasant emotions while teaching and is less appropriate to experience unpleasant emotions (Schutz, Cross, Hong, & Osbon, 2007; Taxer & Frenzel, 2015; Zembylas, 2003). In the context of professional development, socio-historical understandings of authority and power within school hierarchies can elicit strong emotional reactions in teachers while also encouraging teachers to hide and suppress these emotional reactions (Darby, 2008; Turner et al.,

2009). Understandings of socio-historical contexts are important to gathering understandings of the cognitive appraisals that are antecedents to teachers' emotional experiences during professional development (Zembylas, 2010).

Appraisal theories of emotion

Appraisal theorists posit that emotions are responses to individuals' cognitive appraisals of features of their environment that are significant to them in some way (Moors et al., 2013). The process of appraisals resulting in emotions is continuous and recursive, and emotions serve as antecedents for future appraisals. In this way, emotional episodes are seen as dynamic and continuously changing processes (Frijda, 2008). Individuals can experience multiple emotions simultaneously. For example, a teacher in PD may hear another teacher share an experience and appraise the moment as exciting. Her heart may begin to beat faster, and she may feel a sense of excitement in her body. Sensing this excitement, she then may begin to think about her own future implementation and become both excited and fearful. Although there are several appraisal theories of emotions (e.g., Arnold, 1960; Fredrickson, 2001; Frijda, 2008; Lazarus, 1991; Pekrun, 2006), two in particular may be especially useful when considering teachers' emotional experiences surrounding professional development experiences: Pekrun's (2006) control-value theory, and Fredrickson's (2001) broaden and build theory.

Control-value theory of achievement emotions

Pekrun (2006; Pekrun & Perry, 2014) proposed an appraisal theory for academic, or achievement emotions. In control-value theory, achievement emotions are seen as the joint product of students' and teachers' appraisals of task *control* (i.e., in control vs. out of control) and *value*. In achievement situations, emotions are aroused and modulated by individuals' appraisals of their competence, estimations of predicted success, and values for the outcomes and tasks. Emotional experiences are caused by cognitions, but emotions then influence future cognitions (i.e., a bidirectional relationship between emotion and cognition; Frenzel et al., 2009). In this way, cognitions start new emotional experiences, but are continuously influenced by recently experienced emotional states (Fredrickson, 2001; Keller, Chang, Becker, Goetz, & Frenzel, 2014; Shuman & Scherer, 2014).

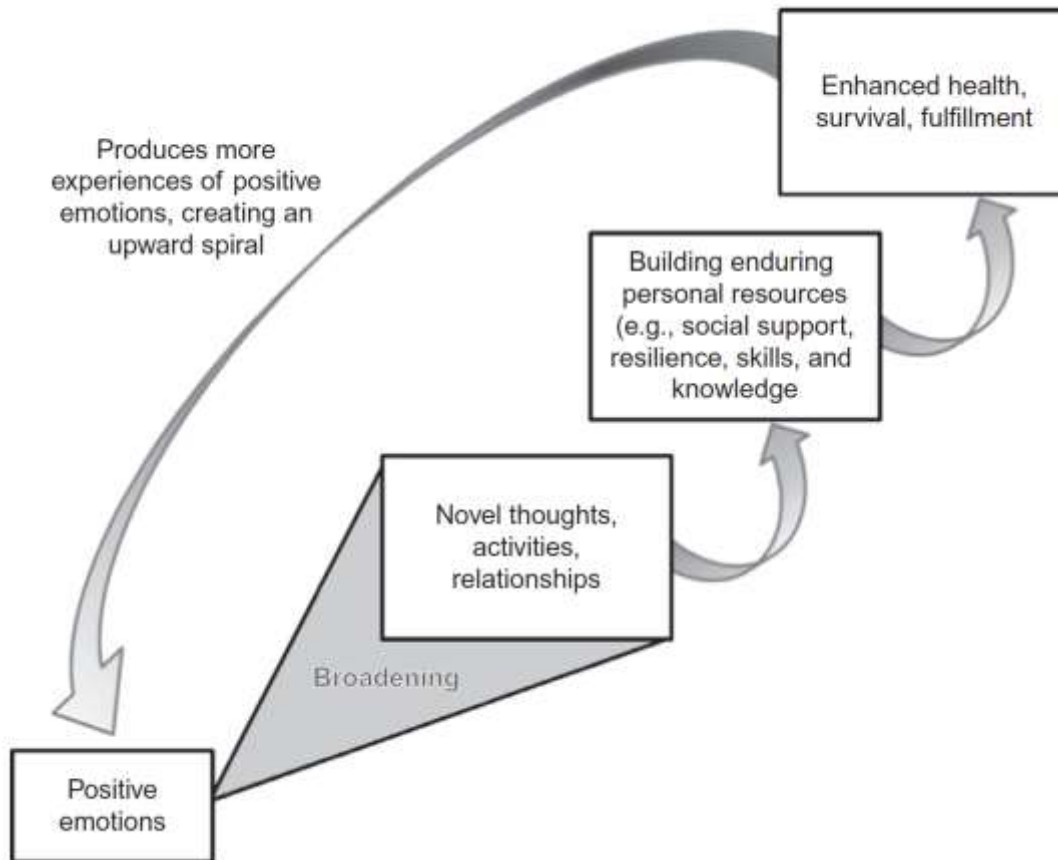
Closely related to expectancy-value theory, control-value theory provides a strong framework for outlining the relationships between teachers' motivations and their emotional experiences. For example, when attending a professional development event, a teacher may believe (i.e., appraise) that the expectations of the professional development are too high and too difficult to implement; this appraisal may lead to feelings of anxiety or frustration. By contrast, another teacher participating in the same professional development may believe that the expectations are attainable and envision benefits for students; these appraisals may lead to feelings of hope and inspiration (Leithwood & Beatty, 2008).

Broaden and build

Fredrickson's (2001, 2013) broaden and build theory of emotions may be helpful in understanding how teachers' emotions have impact on their experience of professional development. Fredrickson theorized that pleasant emotional episodes momentarily broaden an individual's thinking, enabling him/her to be more creative, resourceful, and resilient (Fredrickson, Tugade, Waugh, & Larkin, 2003; Fredrickson & Joiner, 2002; Lyubomirsky, King, & Diener, 2005). Over time, multiple episodes of pleasant emotional experiences build powerful personal resources. Individuals who experience more pleasant emotions build "enduring resources" that can lead to positive outcomes. In addition, these enduring resources can assist individuals when they experience difficulties in their daily lives (Fredrickson, 2013). This reciprocal "upward spiral" can be seen in Figure 2.4. By contrast, unpleasant emotions limit one's thought processes momentarily and eventually contribute to limiting long-term psychological resources. Fredrickson and Branigan (2005) tested this theory in laboratory settings, inducing pleasant emotions in participants, before asking them to complete various tasks. Those with induced pleasant emotions, had broader, more flexible, and more open-minded thinking (see, for a review, Fredrickson, 2013).

Figure 2.4

Fredrickson's (2001) broaden and build theory of emotions.



To research the building effects of emotions, Fredrickson and colleagues have turned to more applied research (e.g., adults at work; Catalino & Fredrickson, 2011; Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008; Salanova, Bakker, & Llorens, 2006). Schutte (2013) found that adults who participated in an intervention inducing pleasant emotions experienced greater work-related self-efficacy and psychological resources (i.e., work satisfaction, mental health, relationship satisfaction). In a longitudinal cross-sectional study with teachers, Salanova and colleagues (2006) found that teachers' pleasant emotional experiences (conceptualized as "flow at work") at Time 1 predicted

their personal resources at Time 2. As teachers experienced more pleasant emotions, they became more efficacious and innovative.

For teachers, pleasant emotions during a professional development experience may be especially powerful in helping them broaden the ways in which they integrate what they learn during professional development with their existing knowledge and skills, building their expectancies for success and their resilience to implement over time. Specifically, the broadening of teachers' thoughts will build increased expectancy beliefs over the course of a professional development session and result in more creative intentions to implement the PD. Finally, as implementing professional development can be quite difficult, positive emotions experienced during professional development may serve to "build" the emotional resilience necessary for teachers to change their teaching practices and implement what they have learned during professional development.

Teachers' emotions

Although all employees experience emotions during their work (see Weiss & Brief, 2001), the work of teaching is especially emotional (Frenzel, 2014; Hargreaves, 1998; Saunders, 2013; Scott & Sutton, 2009; Sutton & Wheatly, 2003). Teachers' emotional bonds with their students lie at the heart of teachers' work, and teachers may experience their strongest emotions while in the act of teaching (Day & Leitch, 2001; Hargreaves, 1998). There is some evidence that teachers most frequently experience enjoyment, anxiety, and anger while they teach (Frenzel et al., 2009; Frenzel et al., 2015; Taxer & Frenzel, 2015), and emotional experiences during class may directly influence student learning outcomes (Becker, Goetz, Morger, & Ranellucci, 2014; Day & Leitch,

2001; Frenzel, 2014). Colloquially, it seems that “inspired” teachers with passion and emotional zest are likely to inspire similar academically-related emotions in their students, foster emotionally positive learning environments, thereby increasing motivation and performance in students. In addition, teachers who are more aware of their emotional experiences and are better able to manage them while teaching experience greater job satisfaction and less burnout (Ju, Lan, Yi, Feng, & You, 2015).

Keeping positive affect in the face of challenging classroom situations (e.g., struggling or disruptive students, difficult colleagues, or administrative policies) can take an emotional toll on teachers (Taxer & Frenzel, 2015). Hargreaves (1998) labeled this emotional struggle in teachers *emotional labor*. Teachers experience emotional labor when they believe they are expected to feel and experience emotions in one way (e.g., joyous and inspired) when they truthfully feel another way (e.g., sad and frustrated). Emotional labor can lead to emotional exhaustion and burnout (Philipp & Schüpbach, 2010), and eventual departure from the teaching profession (see for a review, Chang, 2009).

Teachers’ emotions and professional development

There is evidence that teachers’ emotional experiences at work while in professional development may be qualitatively different from their emotional experiences while teaching (Osman, Maddocks, Warner, & Schallert, 2015; Saunders, 2013; Spillane et al., 2002). Professional development requires a degree of risk-taking, as teachers are expected to learn and try out new practices, practices that may run counter to their beliefs, teaching identity, and goals (Reio, 2005; Saunders, 2013). Taking risks and

changing teaching practices can be especially emotionally laborious for teachers, as emotions are intertwined with beliefs, identity, and goals (Cross & Hong, 2009, 2012). When professional development challenges teachers' personal identities, they are likely to experience negative emotions (Reio, 2005).

During times when teachers are expected to change their practices, they can experience complex suites of emotion. They may feel fear and excitement at the same time (Darby, 2008), or anger towards policy makers along with a sense of guilt for students' unmet needs (Lasky, 2005). Although the antecedents of teachers' emotions in professional development have so far been largely unexplored, it is reasonable to expect that poorly designed reform efforts can elicit teachers' feelings of frustration, fear, anxiety, and guilt (Reio, 2011). Emotions such as these do not appear to be epiphenomenal, and serve to *limit* development and growth rather than *support* change (Darby, 2008; Lasky, 2005; Slavit, Sawyer, & Curley, 2005). For example, a teacher filled with hope and joy during a professional development might engage more deeply in learning during the experience and might see new and innovative ways to implement her learning in her teaching. In contrast, a teacher overwhelmed with stress and shame during a PD might be unable to make connections to her practice, focusing narrowly on the minimum requirements set forth in the training. It is not clear, however, if teacher emotions during professional development are largely predicted by contextual and situational factors or if pre-existing emotional dispositions exist across teachers and interact with PD experiences.

The characteristics of a specific professional development may play a moderating role in the emotions that teachers experience during professional development and

outcomes (Rijdt et al., 2013; Wei et al., 2009). Like classroom lessons, professional development experiences can foster positive or negative emotions in students – or teachers in this case. Professional developments that align with teachers’ beliefs and values and foster a sense of efficacy in teachers may induce positive emotions such as hope and inspiration. Also, professional development that includes active learning, peer discussion, and model lessons may induce general positive feelings such as satisfaction and happiness. These positive emotions may be strongly related with teacher outcomes such as intentions to implement professional development and changes in teacher knowledge, beliefs, and classroom practices.

Teacher-learners’ individual characteristics may play a moderating role in the emotions they experience in professional development (Rijdt et al., 2013; Turner et al., 2009). Teacher experience, prior knowledge, values, beliefs, personality, and motivations may all have differential effects on emotions during professional development and outcomes. For example, teachers with less teaching experience may be more likely to experience anxiety or hope during professional development. For an inexperienced teacher, the overwhelming nature of changing her teaching practices may lead to anxiety (Saunders, 2013). On the other hand, a teacher’s lack of experience may support her willingness to seek change and hope. The intersection of teaching experience and teachers’ emotional experiences during professional development remains an open question.

Future directions

Although the research on teachers' emotional experiences is increasing, a divide remains between research on emotions and research on teachers' emotions (Saunders, 2013; Scott & Sutton, 2009). Scott and Sutton (2009) posited that this divide exists because traditional research on emotions is largely quantitative, whereas research on teachers' emotions is largely qualitative. More research that crosses these traditional boundaries is needed (i.e., qualitative work on emotions in general, quantitative work on teachers' emotions). As we learn more about teachers' emotional experiences, we can begin to take deeper dives into the various aspects of their work, including teachers' experiences during professional development. Research on teachers' emotions during professional development may assist us in understanding how and why teachers are motivated to implement professional development. Identifying discernable patterns in teachers' emotional experiences during professional development may enable practitioners to design effective professional development that positively supports teachers' experiences during times of professional growth and change (Saunders, 2013).

Chapter Three: Method

In the current study, I focused on teachers' motivation and emotion during professional development, researching the antecedents and consequences of teachers' motivational and affective experiences. I was especially interested in two potential consequences of teachers' motivation and emotion during a PD: intended and actual implementation of that PD. As teachers were attending in different professional development trainings, data analysis included multilevel models with teachers nested in professional development trainings. The questions these analyses addressed were the following:

RQ1: How is motivation (i.e., expectancy, value, cost, expectancyXvalue) associated with implementation?

RQ2: How are educators' emotions (i.e., pleasant, unpleasant) associated with implementation?

RQ3: What is the relationship between cognitive factors (i.e., knowledge, teaching efficacy) and motivation to implement a PD?

METHODOLOGICAL ISSUES

Issues in researching emotional experiences

Even though emotions are physiological experiences, affective experiences are always subjective. In addition, they can be fleeting and momentary experiences. Because of this, objectively measuring these experiences is difficult for researchers (Pekrun &

Bühner, 2014; Zembylas, 2003). Most commonly, emotions researchers use self-report measures to research participants' emotional experiences (Pekrun & Bühner, 2014). Research techniques include surveys (quantitative and qualitative), interviews, and focus groups. Self-report measures ask participants to *recognize* the existence of emotions, *recall* or remember the emotional experience, and then *report* on the strength, valence, and duration of these emotional experiences. Researchers have noted that there are limitations with using techniques that require participants to self-report emotions (see Pekrun & Bühner, 2014).

Some of these limitations include that participants may not *recognize* many emotional experiences in the moment. One can experience emotions without being cognitively aware of this experience. Research on emotional mindfulness indicates that many of us experience the physiological characteristics associated with stress or anger without overtly recognizing that we are experiencing these emotions (deMarrias & Tisdale, 2002). In order to recall an emotional experience one must recognize that it has occurred, as a participant who was not overtly aware that he or she was experiencing an emotion would not be able to self-report that emotion to researchers. This also may lead individuals to recall only the most salient or extreme emotional experiences (Sutton & Wheatley, 2003).

When *recalling* emotional experiences later in time, participants may not remember their emotions as they experienced them at the time (deMarrias & Tisdale, 2010). Participants' reports of their own emotions are especially susceptible to systematic biases due to beliefs and implicit theories about emotions (Barrett & Barrett, 2001; Robinson & Clore, 2002). This misremembering may cause individuals to recall only

some emotions (Zembylas, 2003, 2005). The essence of this criticism is not that participants are deceiving researchers and reporting only the most socially desirable emotions; participants may be honestly recalling the emotional situation in systematically biased ways.

Finally, some participants may be weary or hesitant when *reporting* some emotional experiences. Participants may be unwilling to share descriptions of their emotional experiences with researchers. Reluctance to report may be especially pronounced when participants have not built relationships with researchers (e.g., as in much survey research; deMarrias & Tisdale, 2010) or when participants' emotional experiences involve sensitive subjects (e.g., emotions while at work; Zembylas, 2010). In these cases, participants may be more likely to report socially appropriate emotional experiences or more neutral emotional experiences that are either strongly pleasant or unpleasant.

Issues in researching outcomes of professional development

Conceptualizing the outcomes of professional development can also be difficult (Opfer & Pedder, 2011; Yoon et al., 2007). The first topic of concern is determining at what level (student or teacher) researchers want to measure outcomes. Often, practitioners and researchers evaluate professional development activities by the degree to which these affect student-level or teacher-level outcomes. When evaluating the outcomes of professional development, measuring student-level outcomes introduces a host of variables that may be unrelated to the professional development itself. For instance, a professional development experience may have powerful effects on teachers,

changing their beliefs and practices, but the changes in teachers' beliefs and practices may have negligible (or negative) effects on students. This may occur when school contexts prevent implementation, or when the practices taught in the PD are ineffective. Researchers of professional development typically conceptualize teacher-level outcomes as either cognitive (e.g., beliefs, attitudes, knowledge), or behavioral (e.g., change in practice; Opfer & Pedder, 2011). Teachers may intend to change their classroom practice following a professional development (a cognitive outcome) but fail to change their actual instructional practice (a behavioral outcome).

As with all longitudinal research, it can be difficult to follow through with teachers to measure their actual instructional practice several months after a PD. Teachers are notoriously busy and can be overwhelmed by the day-to-day business of school. Whereas researchers have teachers' undivided attention during a professional development experience and can easily collect survey data, teachers may be less likely to respond to calls for data collection (e.g., answering online questionnaires, scheduling classroom observations or interviews) during the school year. In addition, one may hypothesize that teachers' likelihood to respond may be correlated to their motivational and emotional experience during the professional development of interest. For instance, a teacher with a particularly salient emotional experience (either pleasant or unpleasant) may be very interested in following through with researchers, whereas a teacher who cannot recall the PD may simply ignore requests to collect data. Research that attempts to measure both cognitive (e.g., intentions) and behavioral (e.g., changes to instructional practice) outcomes can mitigate some of these concerns.

PARTICIPANTS

Participants ($n = 673$) were recruited from a pool of teachers, instructional coaches, and principals enrolled in several related summer professional developments in five school districts in Texas. These staff members were working with students in pre-Kindergarten through Grade 12. Approximately 80% ($n = 478$) of the participants were teachers, 13% were instructional coaches, 4% were other campus administrative staff (e.g., assistant principals, librarians, paraprofessionals, principals, reading specialists), and the remaining 1% were district-level staff (e.g., district English/Language Arts directors). Teacher participants were primarily elementary teachers (77%), although there was a sizeable group of secondary teachers (22%). Although elementary teachers taught all subjects, secondary teachers mostly taught English language arts (56%) and social studies (26%). Smaller groups of secondary teachers taught math (16%) and science (8%). Elementary teachers had, on average, 30 students in their classes, whereas secondary teachers taught approximately 120 students each. Participants averaged 11.99 (9.13 SD; range 0 – 48) years in the field of education, slightly higher than the state average.

The sample was 38% Hispanic, 38% White, 15% African-American, 2% Asian-American, and <1% ($n = 4$) Native American. Participants' ages averaged 41.2 years (11.0 SD; range 23 -76). The highest degree held for most participants was either a Bachelor's degree (57%) or a Master's degree (36%). A small group of participants held only a high school degree ($n = 22$; 3%). Participants who held only a high school degree were all early childhood teachers or paraprofessionals (i.e., teachers' assistants). One participant held a terminal degree (i.e., PhD, EdD, JD). Although most participants were

certified through traditional means (e.g., university teacher certification; 57%), many were certified via alternate certification programs (35%).

SETTINGS

During summer 2016, participants ($n = 673$) participated in one of 64 professional development programs in one of five public school districts in Texas (Alpha Independent School District, AISD; Beta Independent School District; BISD; Mango Independent School District; MISD; McAlpha Independent School District; Tango Independent School District; TISD; pseudonyms). On average, there were 10.5 participants per professional development training (range, 4 – 38). Presenters and PD facilitators were trainers from The Meadows Center for Preventing Educational Risk (MCPER) and local district staff (e.g., instructional coaches, curriculum specialists).

Alpha ISD offered three separate professional development trainings to elementary and secondary educators throughout June and July. Teachers ($n = 39$) volunteered to participate in these literacy trainings and received a stipend for attending from the school district, independent of this study. Thus, educators' participation in this study did not influence their stipend receipt. Employees of MCPER facilitated the trainings and each lasted six hours.

Beta ISD offered a summer literacy institute in late July and early August. Participation in the institutes was voluntary and educators were able to choose from a variety of trainings. Although the literacy institute lasted for two weeks, the teachers ($n = 117$) each attended only one day of training. Seven trainings were offered and each lasted approximately 4 hours. All PD facilitators were employees of MCPER.

Mango ISD offered a two-day summer literacy institute in June with 40 available literacy trainings. Trainings lasted 4 hours. Participation was voluntary and teachers ($n = 399$) chose which of the trainings they would attend. Although most facilitators were employees of MCPER, some were local MISD employees.

McAlpha ISD offered two weeks of literacy trainings for campus leaders (i.e., lead teachers, instructional coaches, administrators) in July. Participation in the half-day (4 hours) trainings was voluntary for these leaders ($n = 113$). All facilitators were employees of MCPER.

Tango ISD offered a one-day literacy training in June. Teachers ($n = 5$) voluntarily attended the daylong training (6 hours) hosted at their home campus. Facilitators were employees of MCPER.

Professional development programs

Each of the 64 trainings was focused on effective literacy instruction, with trainings including topics such as *The Six Syllable Types*, *Differentiated Instruction for Secondary Teachers*, *Effective Instruction for English Language Learners*, and *Vocabulary and Oral Language Development*. A complete list of training titles is included in Appendix A. Published by MCPER, professional PD writers wrote and designed each of the literacy trainings. Although the training topics were diverse within the topic of literacy, the trainings adhered to a common approach: an emphasis on explicit instruction with systematic scaffolding and student practice. The professional development trainings also shared a common canon of pedagogical techniques. Participants completed a variety of instructional strategies including explicit instruction

in whole group settings and peer discussion in small groups. Participants analyzed student-level data, viewed short videos modeling effective practices, and read relevant research. Participants also overtly reflected by participating in writing-to-learn activities and planning instructional practices with peers.

INSTRUMENTS

Teacher participants completed two sets of measures using either Qualtrics, a secure online survey tool, or on paper. The first set of measures was administered immediately following the PD experience. The questionnaire, as distributed during the professional development, is included in Appendix B. Participants' email addresses and demographics were collected during the initial round of data collection. The second set of measures was distributed online via email during the middle of the fall 2016 semester. This second round of data collection included one questionnaire, the implementation self-report.

To test the validity of the first set of measures and determine if the questionnaire length was burdensome, I field tested the questionnaire (Appendix B) with a small group of early childhood teachers ($n = 18$) following a professional development in May. Teachers were asked at the end of the questionnaire to write responses to the following two open-ended questions, "*Is there anything else you would like to tell us?*" and "*Was it easy to complete this survey?*" The professional development facilitator asked a smaller group of participants for feedback on the questionnaire (e.g., by asking questions such as, "*Was there anything that did not make sense?*" and "*Was there anything that you didn't*

feel comfortable answering?”). The PD facilitator also measured the time necessary for participants to complete the survey.

Motivation for implementing professional development

Immediately after completing the training, participants completed the Expectancy-Value for Professional Development Scale (EV-PD; Osman & Warner, 2016; Warner & Osman, 2017) to measure motivation to implement professional development. The 9-item scale asked participants to respond to Likert-type items measuring three constructs, expectancy for success, value, and cost. Items were written to be aligned with expectancy-value theory (Eccles & Wigfield, 1995; Harvey, 2014; Kosovich et al., 2014), but phrased so as to describe participants’ motivation for a particular professional development experience. Modifying items from previous research to include more contextual specificity (e.g., to measure intrinsic values about implementing a professional development) is commonly done in expectancy-value research (Wigfield et al., 2009). Expectancies for success were measured by items such as, *“I am confident I can do what was asked of me in this professional development.”* Values about the training were measured by items such as, *“Participating in this training will help me in my job”* (utility value), *“I am excited to put this training into practice”* (intrinsic value), and *“It is important to me to apply what I learned in this professional development”* (attainment value). Perceptions of cost were measured by items such as, *“I have to give up too much to put this training into practice”* (loss of valued alternatives), *“Applying this professional development will require too much effort”* (effort costs), and *“Applying this training will be too stressful”* (emotional costs). Cost items were negatively worded, but

reverse-scored. In previous research, measures of internal consistency on each factor ranged between .75 and .94 (Osman & Warner, 2016). Items can be used to form three subscales representing expectancy, value, and cost (each with three items), or one scale representing motivation.

Emotional experiences

Teachers' affective experience during the training was measured using the Positive Affect, Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS consists of 20 items that each measure discrete emotion experiences (e.g., enthusiastic, inspired; irritable, upset). Previous research has used the PANAS to measure participants' emotional experiences "in general," "in the past week," and "today" (Crawford & Henry, 2004; Watson et al., 1998). In this study, each emotional experience was rated by participants on the extent that they experienced the emotion "during the professional development you just attended." Ratings varied from 1 "*never*," 3 "*sometimes*," 5 "*about half the time*," 7 "*most of the time*," to 9 "*always*." Items typically form two factors, 10 items measuring pleasant affect and 10 items measuring unpleasant affect. In previous research with educators, measures of internal consistency for each factor were strong for both pleasant and unpleasant affect (Cronbach's α of .77 and .86, respectively; Malmberg & Hagger, 2010).

Teacher learning

A retrospective pretest self-report measured teachers' learning during the professional development. Retrospective pretest measures are administered after a

program (or professional development) is completed, and enable participants to reflect on their existing level of knowledge (posttest) and their knowledge prior to the program (pretest; Bhanji, Gottesman, de Grave, Steinert, & Winer, 2012; Pratt, McGuigan, & Katzev, 2000). Differences in self-reported knowledge after the program (posttest) are compared to knowledge before the program (pretest). Traditional self-reports administered at pretest can suffer from participants' overestimation of their knowledge, as participants lack a true understanding of the skills and knowledge necessary to implement a program successfully. During training, participants change their point of reference about their prior knowledge, as they begin to understand that they did not understand (Howard & Dailey, 1979). In this way, the training has shifted participants' understanding of what is being measured. For example, a teacher might believe that he understands how to use data to guide his instruction; however, during the training, the teacher might realize that his approach was inadequate and that a newly learned approach would benefit him greatly. A traditional pre-post self-report of knowledge would not capture this teacher's change in perspective whereas a retrospective pretest measure would.

Participants completed a retrospective pretest measure after completing the professional development. Participants rated their knowledge of various aspects of the training "NOW," before rating their knowledge "BEFORE the professional development." Sample item presentation is shown in Figure 1.

Figure 3.1

Sample retrospective pretest items measuring participants' learning.

	NOW				BEFORE the professional development			
	1 Poor	2 Fair	3 Good	4 Excellent	1 Poor	2 Fair	3 Good	4 Excellent
Rate your knowledge of the content presented in the training.	1 ○	2 ○	3 ○	4 ○	1 ○	2 ○	3 ○	4 ○
Rate your knowledge of ways to teach the content presented in the training.	1 ○	2 ○	3 ○	4 ○	1 ○	2 ○	3 ○	4 ○
Rate your knowledge of the teaching strategies presented in the training.	1 ○	2 ○	3 ○	4 ○	1 ○	2 ○	3 ○	4 ○

Sense of efficacy for teaching

The Teacher Sense of Efficacy Scale (TSES; Tschannen-Moran & Woolfolk Hoy, 2001) was administered after the professional development. The TSES measures teachers' efficacy for teaching – their beliefs that they can take action to control various aspects of their teaching environment. The TSES instructs teachers to rate their efficacy on these prompts using a 9-point Likert-type scale (i.e., 1 “*not at all*,” 3 “*very little*,” 5 “*some influence*,” 7 “*quite a bit*,” 9 “*a great deal*”). The scale has shown strong internal consistency in research with teachers (Cronbach's α between .83 - .94; Klassen et al., 2009; Fives & Buehl, 2009).

Implementation intent

Participants' intent to implement the content of the professional development training was measured after the PD experience through eight Likert-type items. As seen in previous research (Abrami et al., 2004; Ajzen, 1991; Foley, 2011), participants rated how likely they were to implement key activities and procedures included in the professional development, using a scale of 1 to 9 (1 "*definitely will not*," 3 "*probably will not*," 5 "*might or might not*," 7 "*probably will*," 9 "*definitely will*."). Items included, "*To what degree to you plan to implement the content presented in the training?*," "*To what degree to you plan to implement the teaching strategies presented in the training?*," and "*To what degree to you plan to implement the activities the professional development?*"

Implementation self-report

During the fall semester following the summer PD, a subset of participants ($n = 132$) were contacted via email to complete a self-report measuring their actual implementation. In this communication, participants were reminded of the nature of the specific training in which they participated. Participants rated the degree to which they had implemented the same key activities and procedures reported immediately following the professional development through the same three items used to measure Implementation Intent, but adjusted to reflect implementation in the fall semester rather than intended implementation. As before, Likert-type items enabled participants to rate their actual implementation from 1 to 9 (1 "*not at all*," 3 "*very little*," 5 "*somewhat*," 7 "*quite a bit*," 9 "*to a great extent*"). Items included, "*To what degree did you implement*

the content presented in the training?, To what degree did you implement the teaching strategies presented in the training?,” and “To what degree did you implement the activities the professional development?”

Demographic information

Participants were asked to respond to several questions regarding their demographic characteristics. These characteristics were collected immediately following the PD, after participants completed the questionnaire. Responses were open-ended, unless noted otherwise by choices within parenthesis. Participants reported their gender, ethnicity, age, number of years in education, certification status (yes, no), initial certification process (traditional, alternative), highest degree earned (BA, MA/MEd, PhD/JD), role on campus (teacher, instructional coach, principal or administrator, reading specialist), student grade taught, subject taught (English language arts, social studies/history, science, math, music/art/theater), and number of students taught last year.

PROCEDURES

Immediately following the professional development training, teachers completed a set of self-report surveys, listed in Table 1. Surveys were administered in one of two ways, paper and pencil or online. The professional development facilitator either handed participants paper copies of the survey, or provided an online link to the Qualtrics survey (<http://tinyurl.com/UTPDSurvey>). Participants typically took between 2 and 5 minutes to complete the questionnaire.

Two researcher-induced errors prevented two points of data from being collected from participants immediately following the professional development. The first was that 60% of participants were not offered the measure of general teacher efficacy, the Teacher Sense of Efficacy Scale. In addition, 80% participants were not provided a prompt for providing an email address.

During the middle of the semester immediately following the summer professional developments (Fall 2016), all participants who provided an email address ($n = 132$) were contacted via email to complete a follow-up survey including one measure, a self-report of implementation behavior. Personalized emails were sent using the mail merge function of Qualtrics. Emails were personally addressed to each participant and included a short description of the participant's specific summer professional development experience. An initial set of emails was sent in early October to all participants using a tracking feature. A second round of emails was sent two days later to those who had not yet participated. Finally, a third round of emails was sent to the last group of teachers who had not yet participated. In the end, 63 participants (48% of those contacted; 9% of original sample) responded to this follow-up survey. Participants who responded to the follow up survey were not significantly different from non-responders on most demographic characteristics (i.e., gender, race, teaching preparation program, highest degree obtained; $p > 0.01$) except number of years in education. Participants who responded to the follow-up survey tended to be more experienced than non-responders (M years = 15.65, M years = 11.62, respectively; $t_{(645)} = 10.77$, $p < 0.01$). The proportion of respondents and non-respondents were approximately equal from Mango, Tango, and McAlpha ISDs ($p > 0.01$). However, respondents were more likely than non-respondents

to be educators from Alpha ISD ($t_{(671)} = 97.97, p < 0.001$) and respondents were less likely than non-respondents to be educators from Beta ISD ($t_{(671)} = 9.89, p < 0.01$).

ANALYSIS PLAN

Using the aggregate raw scores from each scale, means, standard deviations, and bivariate correlations were calculated. Reliability analyses were conducted to determine each scale's internal consistency. Multilevel confirmatory factor analysis (MCFA) was used to assess the construct validity of the hypothesized factors on each scale and calculate factor scores. To predict participants' implementation intent, analysis was conducted using hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002). Participants' self-reported implementation was predicted using multiple regression analyses.

Multilevel confirmatory factor analysis

Factor analysis was conducted to assess reliability and construct validity. As teachers were nested in professional development experiences, and these professional development experiences likely influenced how participants responded to items, I did not assume that observations were independent. To avoid introducing biases that occur by ignoring dependence or aggregating observations across groups, I conducted a series of multilevel confirmatory factor analysis in *Mplus* (MCFA; Pornprasertmanit, Lee, & Preacher, 2014). As these data were collected using Likert-style scales and may be multivariate non-normal, maximum likelihood robust (MLR) estimations were used. In *Mplus*, MLR does not assume multi-variate normality in the data, does not require

balanced group sizes, and handles missing data well using full-implementation maximum likelihood (FIML; Byrne, 2013; Heck & Thomas, 2015; Muthén & Muthén, 2015).

Model fit was evaluated using the recommendations of Hu and Bentler (1999) for comparative fit index (CFI; > 0.95), Tucker-Lewis index (TLI; > 0.95), root mean squared error of approximation (RMSEA; < 0.06), and standardized root mean squared residual (SRMR; < 0.08).

Hierarchical linear modeling

To address the research questions, multi-level models were tested using *Mplus* (Muthén & Muthén, 2015), using the procedures detailed by Heck and Thomas (2015), Byrne (2013), and Muthén and Muthén (2015). Participants were not randomly assigned to professional development trainings and it is reasonable to believe that clustering in common PD contexts contributed to common variance in participants' experiences. Because ignoring this clustering could have unanticipated effects on the analysis, analytic techniques that account for a lack of independence between observations are most appropriate (Luke, 2004; Muthén & Asparouhov, 2009). Multilevel analyses enable researchers to account for the dependence of observations that occurs in nested data, generating standard errors that are more accurate and less biased effects (Rabe-Hesketh, Skrondal, & Pickles, 2004). HLM analyses for each research question proceeded in at least three steps, unconstrained (null) model, testing of demographic variables as predictors, and random intercepts models. Data calculated in unconstrained models were used to calculate ICCs and design effects.

In each HLM analysis, teachers' demographic data were entered together as predictors of the outcome variable. The same set of demographic variables was entered prior to each analysis. Demographic variables were both continuous (i.e., number of years teaching) and dichotomous. Dichotomous variables included gender (male, female), teaching role (teacher, non-teacher), Hispanic (yes, no), white (yes, no), traditional teacher preparation program (yes, no), and master's degree (yes, no). Significant predictors were kept in subsequent models, whereas non-significant predictors were dropped from these models.

Next, a series of random-coefficient models were tested, predicting outcome variables on sets of variables, as hypothesized. Random-coefficient models allow group-level intercepts to vary, while group-level slopes remain fixed. This analysis accounts for group-level differences on covariates and outcomes but does not assume that group-level differences moderate the relationships between covariates and outcomes. Group-mean centering was used, as group-mean centering is considered a better approach to estimate level-1 effects. Group-mean centering centers individuals' scores at Level 1 on their group means. This approach removes confounding group-level differences from the individual-level predictors, providing more precise estimates of level-1 parameters (Heck & Thomas, 2015).

Multiple regression

As an additional step in these analyses, participants' actual implementation was predicted using multiple regression. Single-level multiple regression was used as the total number of respondents ($n = 63$) was not sufficient to conduct multi-level analyses. For

each research question, multiple-regression models regressed the same predictors as before (i.e., in hierarchical linear models) on participants' self-reported implementation. All predictors were grand-mean centered for these analyses. Interaction terms were calculated from grand-mean centered variables and were not re-centered prior to analysis.

RESEARCH QUESTION 1

Two sets of analyses were conducted to address this research question. Hierarchical linear modeling was conducted to predict participants' implementation intentions during the summer. Multiple regression analyses were conducted to predict participants' self-reported implementation months later in the fall.

A random coefficients regression model predicted individual teachers' (i) intended implementation across multiple groups (j). Implementation intent (y_{ij}) was regressed on individual covariates (x_{ij} ; expectancy for success, value, cost, and the interaction of expectancy and value). A random coefficients regression equation was used to predict outcomes within and between j groups, using group-mean centered scores. The interaction term was calculated by multiplying the group-mean centered factor scores, without re-centering the interaction term. Allowing the intercepts to be freely estimated across j groups, but not the slopes, a random coefficients regression model was used (Equation 3.1), which included the interaction of expectancy and value.

$$\begin{aligned} \text{Intended Implementation}_{ij} = & \gamma_{00} + u_{0j} + \gamma_{10}\text{Expectancy}_{ij} + \gamma_{20}\text{Value}_{ij} + \\ & \gamma_{30}\text{Cost}_{ij} + \gamma_{40}(\text{Expectancy} \times \text{Value})_{ij} + r_{ij} \end{aligned} \quad (3.1)$$

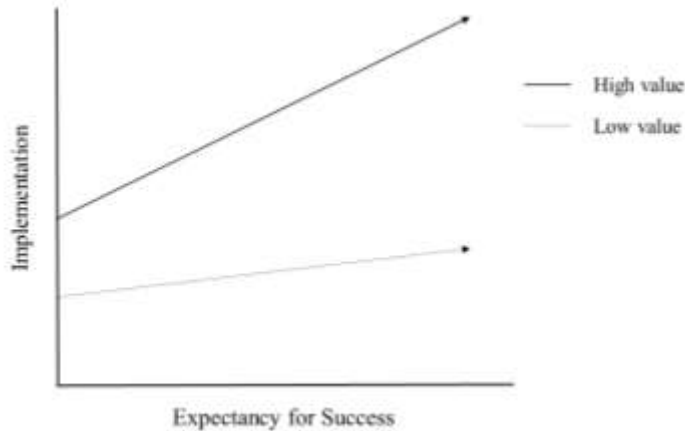
Following multi-level modeling, a single-level multiple regression model was tested to predict participants' self-reported implementation. As before, the raw score averages of expectancy, value, and cost were hypothesized to predict the outcome variable (self-reported implementation, in this case). Above and beyond these predictors, I hypothesized that the interaction of expectancy and value would contribute to the prediction of self-reported implementation (Equation 3.2). In this single-level analysis, predictors were grand-mean centered.

$$\begin{aligned} \text{Self-reported Implementation} = & b_0 + b_1\text{Expectancy} + b_2\text{Value} + \\ & b_3\text{Cost} + b_4(\text{Expectancy} \times \text{Value}) + r \end{aligned} \quad (3.2)$$

For intentions to implement and self-reported implementation, I hypothesized that teachers' expectancy and value would positively predict teachers' implementation (i.e., intentions to implement, self-reported implementation). Teachers' estimations of cost would negatively predict their implementation. Above and beyond these predictors, I hypothesized that the interaction of expectancy and value would significantly predict implementation. The interaction of expectancy and value would indicate that there would be a stronger relationship between expectancy for success and implementation for teachers with high value than those with low value. The hypothesized relationship between expectancy, value, and implementation is displayed in Figure 3.2.

Figure 3.2

Hypothesized interaction effect of expectancy and value on implementation intent.



RESEARCH QUESTION 2

To estimate the effects of emotion on implementation, two sets of analyses were conducted. Initially, a series of hierarchical models were tested to predict participants' intentions to implement immediately following the professional development training. Secondly, multiple regression analyses were conducted to predict participants' self-reported implementation several months later.

To predict implementation intent, a set of random coefficients regression models using group-centered means was tested. As before, the interaction term was calculated by multiplying the group mean centered scores, without re-centering the interaction term. I tested if the relationship between implementation intent and motivation to implement¹ was moderated by pleasant affect (Equation 3.3).

¹ Individuals' scores on *Motivation* were calculated using the raw score average of three *Expectancy*, three *Value*, and three reverse-scored *Cost* items.

$$\begin{aligned}
\text{Intended Implementation}_{ij} = & \gamma_{00} + u_{0j} + \gamma_{10}\text{Expectancy}_{ij} + \gamma_{20}\text{Value}_{ij} + \\
& \gamma_{30}\text{Cost}_{ij} + \gamma_{40}\text{Pleasant}_{ij} + \gamma_{50}\text{Unpleasant}_{ij} + \\
& \gamma_{60}(\text{Motivation} \times \text{Pleasant})_{ij} + r_{ij}
\end{aligned} \tag{3.3}$$

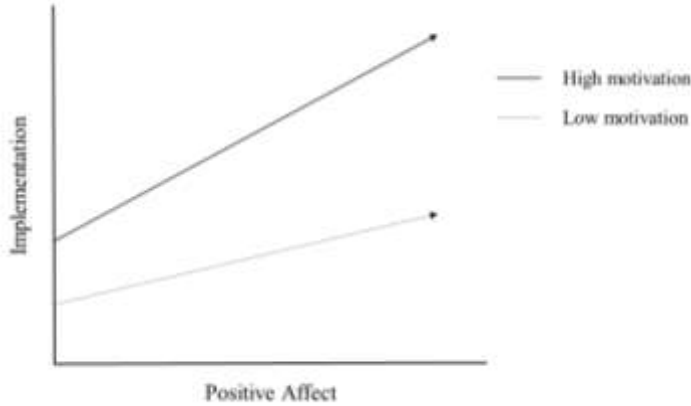
Participants' self-reported implementation was then predicted using the same covariates (i.e., motivation, pleasant affect, unpleasant affect) before testing the moderated effects of motivation and affect on self-reported implementation. Predictors were grand-mean centered and the interaction effect was calculated from the centered scores and not re-centered. This single-level analysis is represented in Equation 3.4.

$$\begin{aligned}
\text{Self-reported Implementation} = & b_0 + b_1\text{Motivation} + b_2\text{Pleasant} + \\
& b_3\text{Unpleasant} + b_4(\text{Motivation} \times \text{Pleasant}) + r
\end{aligned} \tag{3.4}$$

As hypothesized in RQ1, I hypothesized that motivation would positively predict implementation, pleasant affect would positively predict implementation intent, whereas unpleasant affect would negatively affect implementation intent. I hypothesized that the interaction of motivation and pleasant affect would predict intention to implement, above and beyond motivation and affect. The hypothesized interaction effects would indicate that as affect increased (i.e., strong positive affect, strong negative affect) the relationship between motivation and implementation intent increases. For those with pleasant affect (Figure 3.3), I hypothesized that the positive relationship between pleasant affect and implementation would be amplified with increased motivation.

Figure 3.3

Hypothesized interaction effect of pleasant affect and motivation on implementation.



RESEARCH QUESTION 3

Using multi-level models as before, I used a random coefficients regression model with group centered means to predict the relationship between three possible antecedents (i.e., prior knowledge, knowledge gain, teaching efficacy) and motivation. Knowledge gain was calculated by subtracting an individual’s estimated prior knowledge (i.e., “BEFORE”) from their estimated current knowledge (i.e., “NOW”; Equation 3.5)

$$\begin{aligned} Motivation_{ij} = & \gamma_{00} + u_{0j} + \gamma_{10}PriorKnowledge_{ij} + \gamma_{20}KnowledgeGain + \\ & \gamma_{30}TeachEfficacy_{ij} + r_{ij} \end{aligned} \quad (3.5)$$

I hypothesized that motivation would be positively predicted by teachers’ knowledge when they arrived at the professional development and their knowledge gained (i.e., post knowledge – prior knowledge). Teachers’ general sense of teaching efficacy might also contribute to explaining teachers’ motivation to implement.

Chapter Four: Results

This section presents results for each of the three research questions in this study. Descriptive results are presented first, before results of confirmatory factor analyses. Results related to research questions 1 through 3 are presented in numerical order.

DESCRIPTIVE STATISTICS

Descriptive statistics for the hypothesized factors were calculated using the raw scores (Table 4.1). Participants' emotional experiences during professional development were largely pleasant and were not unpleasant. On average, teachers rarely reported experiencing unpleasant affect ($M = 1.30$; scale of 1 to 9). No teacher had an unpleasant affect mean raw score greater than 4.2, indicating that no single participant reported a highly unpleasant experience during the professional development on which they were reporting. Teachers reported holding great degree of knowledge after attending professional development ($M = 3.39$; scale of 1 to 4). This was a gain from their estimates of their own knowledge prior to the professional development. An error in the online data collection system prevented the Teacher Sense of Efficacy Scale to be presented to many participants; therefore, there is a large degree of missing data for this scale. Those who completed the scale (primarily from BISD) were quite efficacious ($M = 7.82$; scale of 1 to 9).

Teachers were, by and large, motivated to implement what they learned during professional development and were optimistic about their intentions to implement ($M = 8.49$; scale of 1 to 9). Those participants who completed the follow-up survey ($n = 63$)

self-reported implementing to a great degree ($M = 4.35$; scale of 1 to 6). During follow-up surveys, teachers largely reported remembering the summer professional development, with 71% reporting that they remembered “a lot” or “a great deal” about the training, and only 3% reporting remembering “none at all” or “a little.”

Reliability analyses

Reliability analyses indicated a great degree of internal consistency within each scale. Cronbach’s alphas were all greater than 0.69 (Unpleasant affect) and averaged 0.91 across the 11 hypothesized factors. Five of the factors averages were quite skewed (skewness $> |2|$), indicating that assumptions of multi-variate normality might not be met in these data. All factors were negatively skewed, except for Unpleasant affect which was positively skewed (skewness = 2.33).

Within- and between-group variance

Intra class correlations (ICCs) were calculated from unconditional two-level models using the TWOLEVEL BASIC function in *Mplus*. Calculated in this way, ICCs represent the proportion of variance in the variable explained between groups (Muthén & Muthén, 2015). ICCs were rather small across the board, ranging from 0.04 (Cost) to 0.17 (Prior Knowledge). In this study, larger ICCs would indicate that a greater portion of the variance in a variable was due to training-level differences, whereas smaller ICCs would indicate that a larger proportion of variance in the variable was explained by teacher-level differences.

Table 4.1

Raw Score Descriptive Statistics

	<i>n</i>	<i>M</i>	<i>SD</i>	Min	Max	Skewness	No. items	α	ICC ^a
Expectancy	672	6.42	0.75	1.0	7.0	-2.74	3	0.94	0.07
Value	672	6.59	0.68	1.0	7.0	-3.23	3	0.89	0.08
Cost ^[R]	672	6.10	1.29	1.0	7.0	-2.14	3	0.93	0.04
Pleasant Affect	671	7.43	1.46	1.2	9.0	-1.71	10	0.93	0.12
Unpleasant Affect	671	1.30	0.49	1.0	4.2	2.33	10	0.69	0.08
Post-Knowledge	669	3.39	0.60	1.0	4.0	-0.88	5	0.95	0.08
Pre-Knowledge	663	2.57	0.74	1.0	4.0	-0.16	5	0.96	0.17
Knowledge Gain ^b	662	0.82	0.88	-2.3	3.0	-0.89	-	0.96	0.08
Teaching Efficacy	256	7.82	0.96	3.5	9.0	-1.02	12	0.95	0.07
Intent to Implement	670	8.49	0.90	2.0	9.0	-2.89	3	0.95	0.07
Implementation	63	4.35	1.06	2.0	6.0	-0.26	3	0.94	-

Note. ^[R] = reverse scored; ^aIntra class correlations were calculated for unconditional models; ^bKnowledge Gain was calculated by subtracting each participant's Pre-PD Knowledge from Post-PD Knowledge; α = Cronbach's alpha; Group-level sample sizes were too small to calculate an ICC for Implementation.

Bivariate correlations

Simple bivariate correlations were calculated from the raw score means in SPSS and are displayed below in the diagonal in Table 4.2. Each bivariate correlation was charted on a scatter plot in SPSS and visually analyzed to identify potential non-linear bivariate relationships; none was identified. Almost all factors correlated as hypothesized. The three motivation to implement factors (i.e., expectancy for success, value, and cost

[reverse scored]) were positively correlated. Although expectancy for success and value were highly correlated, the relationships between cost and expectancy and cost and value were weaker. The motivation factors were positively correlated with pleasant affect, post-PD knowledge, intentions to implement, and teaching efficacy. Interestingly, the relationship between expectancy for success and gained knowledge was not significant.

Participants' pleasant affect during the professional development was highly correlated with value for implementation ($r = 0.58, p < 0.01$) and intentions to implement ($r = 0.57, p < 0.01$), whereas unpleasant affect was negatively correlated with all variables except knowledge gain ($r = 0.06, p = 0.12$). Interestingly, participants' estimations of their knowledge gain were weakly correlated, or not-significantly correlated, with participants' motivation to implement, affect, intentions to implement, and teaching efficacy. As hypothesized, teachers' intentions to implement were highly correlated with expectancy for success in implementation ($r = 0.55, p < 0.01$), value for implementation ($r = 0.57, p < 0.01$), pleasant affect during PD ($r = 0.57, p < 0.01$), and teaching efficacy ($r = 0.56, p < 0.01$).

Despite the relatively small pair-wise sample sizes ($n = 63$), teachers' self-reported implementation, reported several months after attending the PD, was correlated with teachers' expectancy for success ($r = 0.26, p < 0.05$), pleasant affect ($r = 0.31, p < 0.05$), and intentions to implement ($r = 0.26, p < 0.05$). The correlation between intentions to implement and self-reported implementation was lower than expected, however. Unexpectedly, teachers' estimations of cost ($r = 0.09, p > 0.05$) and value ($r = 0.17, p > 0.05$) following the PD were not correlated with self-reported implementation.

Between group correlations

Between-group correlations are estimations of the relationships between aggregate (i.e., training level) scores (Table 4.2; displayed above diagonal). Between-group correlations were calculated in *Mplus* as a part of the TWOLEVEL BASIC unconditional two-level model analysis. Group-level scores on expectancy for success were highly correlated with aggregate value ($r_{Bet} = 0.78, p < 0.01$), pleasant affect ($r_{Bet} = 0.76, p < 0.01$), and aggregate post-PD knowledge ($r_{Bet} = 0.86, p < 0.01$). Aggregate value was highly correlated with pleasant affect ($r_{Bet} = 0.81, p < 0.01$), but, surprisingly, was not significantly correlated with unpleasant affect, pre-PD knowledge, or knowledge gain. Group-level pleasant affect was highly correlated with aggregate post-PD knowledge ($r_{Bet} = 0.72, p < 0.01$) and group-level intentions to implement ($r_{Bet} = 0.64, p < 0.01$). Aggregate unpleasant affect was negatively related with training-level pre-PD knowledge ($r_{Bet} = -0.74, p < 0.01$). Interestingly, aggregate knowledge gain (i.e., post-PD knowledge – pre-PD knowledge) was rarely correlated with other aggregate variables and was positively correlated with training-level unpleasant affect ($r_{Bet} = 0.63, p < 0.01$). Between-group correlations were not calculated for self-reported implementation, as group sizes were too small for reliable calculations.

Table 4.2

Simple Bivariate Correlations and Between-group Correlations

	1	2	3	4	5	6	7	8	9	10
1. Expectancy		.78**	.29*	.76**	-.54**	.86**	.68**	-.26*	.12 ^{ns}	.64**
2. Value	.77**		.39**	.81**	-.09 ^{ns}	.56**	.16 ^{ns}	.19 ^{ns}	-.06 ^{ns}	.59**
3. Cost ^[R]	.24**	.24**		.57**	-.36**	.19 ^{ns}	.04 ^{ns}	.08 ^{ns}	.51*	.19 ^{ns}
4. Pleasant Affect	.48**	.58**	.27**		-.43**	.72**	.29*	.13 ^{ns}	.20 ^{ns}	.64**
5. Unpleasant Affect	-.31**	-.15**	-.23**	-.15**		-.44**	-.74**	.63**	-.45*	-.55**
6. Post-PD Knowledge	.40**	.32**	.15**	.37**	-.18**		.61**	-.08 ^{ns}	.27 ^{ns}	.52**
7. Pre-PD Knowledge	.27**	.08*	-.03 ^{ns}	.10*	-.22**	.15**		-.84**	.23 ^{ns}	.46**
8. Knowledge Gain	.04 ^{ns}	.14**	.13**	.18**	.06 ^{ns}	.56**	-.74**		-.11 ^{ns}	-.22 ^{ns}
9. Teaching Efficacy	.45**	.37**	.19**	.36**	-.35**	.41**	.29**	.05 ^{ns}		.32 ^{ns}
10 Intent to Implement	.55**	.57**	.25**	.57**	-.20**	.32**	.18**	.08 ^{ns}	.56**	
11. Implementation	.26*	.17 ^{ns}	.09 ^{ns}	.31*	-.18 ^{ns}	.11 ^{ns}	.19 ^{ns}	-.10 ^{ns}	-- ^a	.26*

Note. Simple bivariate correlations are displayed below the diagonal, between-group correlations are displayed above the diagonal. * $p < 0.05$; ** $p < 0.01$; greyed values, ^{ns} = non-significant; ^[R] = reverse scored; n varied pair-wise; Between-group correlations were not calculated for participants' self-reported Implementation (i.e., 11); ^a = sample size was insufficient to calculate bivariate correlation.

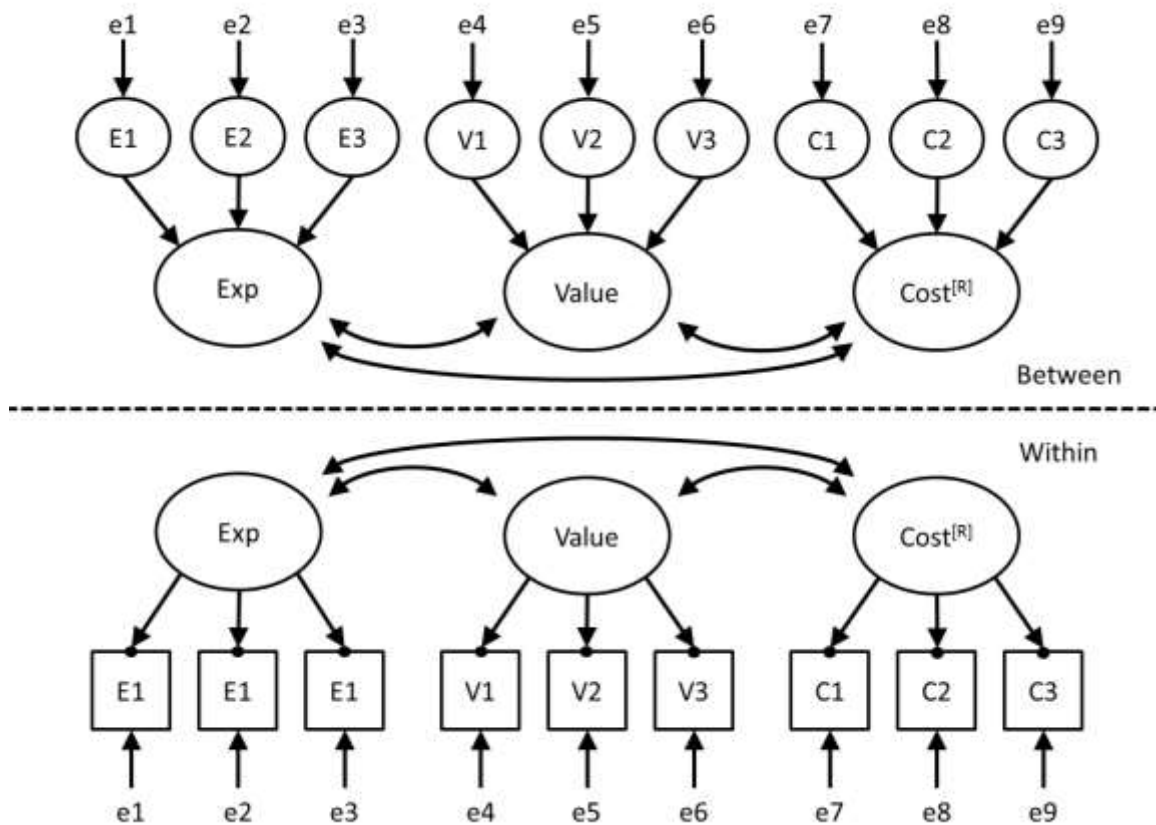
MULTILEVEL CONFIRMATORY FACTOR ANALYSIS

To estimate the fit of these data to the hypothesized latent factors, a series of two-level confirmatory factor analyses (CFA) were conducted using *Mplus* 7.4 (Muthén & Muthén, 2015). A sample two-level factor model is presented in Figure 4.1 as an illustration. All models followed the same multi-level structure as represented in Figure

4.1. Individual observed items were hypothesized to load on latent factors at the teacher level (Level 1). Observed items were conceptualized as latent factors at the training level (Level 2) that varied across groups and are represented by ovals in the model at level 2. These random intercepts, varying across groups (i.e., trainings) at level 2 are also represented by dots on the observed items at level 1.

Figure 4.1

Two-level factor model testing expectancy, value, and cost (Model 1).



All model tests used maximum likelihood robust (MLR) estimation to account for possible multi-variate non-normality across observed variables. Unstandardized factor loadings were restricted to be invariant across levels, which served to standardize the

amount of variance attributed to latent factors (i.e., standardized factor loadings) across both levels of the model (Mehta & Neale, 2005). Sample *Mplus* input can be seen in Appendix C.

Six multi-level models were separately analyzed, including two models estimating motivation. The six models are summarized in Table 4.3. Two models were estimated using the same nine items from the Expectancy-Value for Professional Development Scale. In Model 1, items were set to load on three hypothesized factors (i.e., expectancy for success, value, cost) and the latent factors were allowed to correlate. In Model 2, items were set to load on the same hypothesized latent factors. However, at level 1 the three latent factors (i.e., expectancy, value, cost) were then in turn set to load on an overarching latent factor, motivation. Factor analysis was not conducted on teachers' self-reports of implementation as these analyses were not appropriate with the relatively small number of respondents ($n = 63$).

Table 4.3

Models as Estimated in Confirmatory Factor Analyses

Model	Hypothesized latent factor	Number of items	Scale
Model 1	Expectancy, Value, Cost ^[R]	9	EV-PD
Model 2	Motivation	9	EV-PD
Model 3	Pleasant affect	10	PANAS – pleasant items
Model 4	Unpleasant affect	10	PANAS – unpleasant items
Model 5	Teacher Knowledge	10	Retrospective pre-post
Model 6	Intentions to implement	4	Implementation intent

Note. Models 1 and 2 utilized the exact same 9 items from the EV-PD scale; all other models utilized unique items.

Estimates of model fit

Confirmatory factor analyses indicated that most of the six models fit the data well. Fit indices for each model are displayed in Table 4.4. CFI, RMSEA, and SRMR_{within} fit indices for the motivation (Models 1 and 2), knowledge (Model 5), and intentions to implement (Model 6) data indicated that these four models were good fits for the data. Although the SRMR_{between} indices were too high, indicating that the between-groups models may have been inadequate fits for the data at Level 2, this lack of fit may have been due to the relatively small number of groups in the sample ($j = 64$; Heck & Thomas, 2015). These analyses indicate that these items in this sample have strong construct validity. The model fit for pleasant affect (Model 3) was less good, but was adequate.

SRMR indices within and between were adequate, whereas CFI, TLI, and RMSEA indicated that the data almost fit the model. This CFA indicates that these items have good construct validity. Finally, the model for unpleasant affect fit the data quite poorly, especially between groups ($SRMR_{\text{between}} = 0.391$), indicating that the unpleasant affect scale may have weak construct validity. The unpleasant affect items may not cluster together as hypothesized, and any analyses conducted with this scale should be treated with caution.

Table 4.4

Estimates of Model Fit

Model	Latent factor	χ^2	df	CFI	TLI	RMSEA	SRMR	
							withi n	betwee n
Model 1	Exp, value, cost	185.545	57	0.951 *	0.93 8	0.058*	0.030 *	0.103
Model 2	Motivation	185.545	57	0.951 *	0.93 8	0.058*	0.030 *	0.103
Model 3	Pleasant affect	419.648	80	0.90 2	0.89 0	0.080	0.046 *	0.066*
Model 4	Unpleasant affect	219.413	80	0.71 9	0.68 4	0.051*	0.065	0.391
Model 5	Teacher knowledge	305.353	78	0.961 *	0.955 *	0.066	0.020 *	0.100
Model 6	Intent to implement	5.818	3	0.991 *	0.982 *	0.037*	0.000 *	0.015*

Note. * indicates fit indices meet recommendations for model fit (Hu & Bentler, 1999; CFI/TLI > 0.95; RMSEA < 0.06; SRMR < 0.08).

Factor loadings

With the exception of the unpleasant affect model, all items loaded significantly ($p < 0.01$) on the hypothesized within and between latent factors. Standardized within and between factor loadings, and item communalities (within and between) for these models are presented in Table 4.4. For these models (motivation, pleasant affect, knowledge, intentions to implement), factor loadings at the individual level (i.e., within) were all significant and greater than 0.64 ($p < 0.01$, mean within loading = 0.85), whereas loadings at the group level (i.e., between) were all significant and greater than 0.81 ($p < 0.01$, mean between loading = 0.97). In these models, parameters explained substantial portions of the variance in items, as seen by the communalities ($R^2_{\text{within}} = 0.41$ to 0.92; $R^2_{\text{between}} = 0.66$ to 0.99).

Multilevel confirmatory factor analysis revealed several problems for these data within the unpleasant affect sub-scale of the PANAS. All ten items loaded significantly on the hypothesized factor within groups, although many of the standardized loadings were low (standardized within factor loadings = 0.23 to 0.73; Table 4.5). Four items did not load significantly on the hypothesized factor between groups (upset, hostile, irritable, ashamed). Item communalities, estimates of the variance in an item explained by the latent factor, were quite low within (mean $R^2_{\text{within}} = 0.20$), and almost all of the item communalities at the between level were non-significant.

Intra class correlations

Item level intra class correlations (ICCs) were calculated for each model and are displayed in Table 4.5. ICCs are a ratio of the variance that can be attributed to differences in individuals within groups and differences between groups in a particular model. Item level ICCs were relatively small and ranged from 0.006 to 0.158 (mean ICC = 0.068), indicating that, on average, group level differences for items accounted for approximately 6.8% of item level differences in these multilevel CFAs, whereas individual level differences accounted for 93.2% of variance. The proportion of variance explained by group level differences was smaller than hypothesized.

Table 4.5 Standardized Within and Between Level Factor Loadings, Item Communalities, ICCs

Hypothesized Factor	Item	Factor loading		R^2		ICC
		W	B	W	B	
Expectancy	E1: confident	0.85	1.00	0.72	0.99	0.052
	E2: can be successful	0.96	1.00	0.92	0.99	0.078
	E3: can put into practice	0.93	0.96	0.86	0.92	0.068
Value	V1: excited	0.89	1.00	0.79	0.99	0.090
	V2: will help me	0.86	0.98	0.75	0.97	0.068
	V3: important to me	0.78	0.97	0.62	0.97	0.045
Cost	C1: give up too much ^[R]	0.83	1.00	0.69	0.99	0.015
	C2: too much effort ^[R]	0.98	0.98	0.96	0.96	0.030
	C3: too stressful ^[R]	0.88	0.97	0.79	0.95	0.030
Pleasant affect	P1: interested	0.83	1.00	0.70	0.99	0.124
	P3: excited	0.84	0.89	0.71	0.79	0.153
	P5: strong	0.64	0.88	0.41	0.78	0.083
	P9: enthusiastic	0.86	0.99	0.74	0.99	0.081
	P10: proud	0.67	0.81	0.45	0.66	0.079
	P12: alert	0.64	0.97	0.40	0.94	0.048
	P14: inspired	0.86	1.00	0.74	0.99	0.074
	P16: determined	0.84	0.93	0.70	0.87	0.064
	P17: attentive	0.78	0.99	0.57	0.97	0.057
P19: active	0.68	0.98	0.46	0.96	0.076	
Unpleasant affect	UP2: distressed	0.47	1.00	0.19	0.99	0.029
	UP4: upset	0.26	0.88 ^{ns}	0.07 ^{ns}	0.77 ^{ns}	0.006
	UP6: guilty	0.40	0.38	0.16	0.14 ^{ns}	0.089
	UP7: scared	0.52	0.74	0.27	0.55 ^{ns}	0.043
	UP8: hostile	0.23	0.69 ^{ns}	0.05 ^{ns}	0.48 ^{ns}	0.017
	UP11: irritable	0.27	0.77 ^{ns}	0.07 ^{ns}	0.59 ^{ns}	0.020
	UP13: ashamed	0.28	0.69 ^{ns}	0.08 ^{ns}	0.48 ^{ns}	0.027
	UP15: nervous	0.73	0.84	0.53	0.71	0.040
	UP18: jittery	0.49	0.75	0.24	0.57 ^{ns}	0.039
	UP20: afraid	0.57	0.83	0.32	0.68 ^{ns}	0.022
Pre-PD knowledge	K1: content	0.87	1.00	0.75	0.99	0.158
	K2: ways to teach content	0.91	1.00	0.83	0.99	0.141
	K3: teaching strategies	0.90	.98	0.81	0.97	0.131
	K4: ways to teach strategies	0.92	1.00	0.85	0.99	0.146
	K5: knowledge, key aspects	0.89	0.98	0.79	0.97	0.118
Post-PD knowledge	KN1: content	0.85	1.00	0.73	0.99	0.080
	KN2: ways to teach content	0.91	0.96	0.82	0.92	0.067
	KN3: teaching strategies	0.91	0.94	0.83	0.89	0.063
	KN4: ways to teach strategies	0.90	0.96	0.81	0.97	0.076
	KN5: knowledge, key aspects	0.86	0.97	0.75	0.94	0.075
Intent to implement	I1: content	0.91	1.00	0.83	0.99	0.055
	I2: teaching strategies	0.95	1.00	0.91	0.99	0.046
	I3: activities	0.91	0.93	0.84	0.86	0.055

Note. Models estimated with invariant factor loadings across levels; Expectancy, Value, Cost factor loadings were calculated in Model 1; R^2 = item communality; W = within groups; B = between groups; ^[R] = reverse scored; ^{ns} = $p > 0.01$; $n = 673$.

RESEARCH QUESTION 1

How is motivation to implement related to implementation?

To understand how participants' motivation to implement predicted their intentions to implement, I conducted a series of hierarchical linear models using *Mplus*. Model testing proceeded in four steps, unconstrained (null) model, demographic predictors model, random intercepts model without the ExV interaction effect, and random intercepts model with the ExV interaction effect.

To predict participants' actual implementation as reported several months following the professional development experience, I tested a series of single-level regression models. Initially, I regressed implementation on demographic variables before predicting implementation from expectancy, value, and the interaction of expectancy and value.

Implementation intent

The intercept-only model resulted in an ICC of 0.06, indicating that only 6% of the variance in teachers' intentions to implement came from between professional development trainings, whereas 94% originated in between teachers across all trainings. With an average group size of 10.5, the design effect was 1.53, less than 2.0, indicating that a single-level analysis might not overly exaggerate Type I errors (Heck & Thomas, 2015; Muthén & Satorra, 1995). These analyses indicated that multi-level modeling was

not necessary. However, because the nested nature of teachers within trainings was theoretically justified, I used multiple-level analyses in subsequent analyses.

Teachers' demographic data (i.e., years teaching, gender, teaching role, Hispanic, white, traditional teaching preparation, master's degree) were entered into a random-intercepts HLM model (group-mean centered) as predictors of teachers' implementation intent. Master's degree was a significant predictor of implementation intent ($\gamma_{10} = 0.100$, $p < 0.05$). All other demographic variables were non-significant predictors ($p > 0.05$) of participants' intentions to implement. With the exception of master's degree, all demographic variables were excluded from subsequent analyses predicting participants' implementation intent.

Next, a random-regression coefficients model was tested using expectancy, value, cost (reverse scored), and master's degree as predictors of intentions to implement (Model 1). Predictors were group-mean centered. No interaction effects were included in this model. *Mplus* code for this model is included in Appendix D. These predictors, along with masters' degree, explained 33% of the variance in teachers' intentions to implement ($R^2 = 0.332$, $p < 0.01$; $\tau_{00} = 0.068$; $\sigma^2 = 0.465$). Teachers' expectancies for success, value for implementing, and cost (reverse scored) all significantly positively predicted teachers' intentions to implement. The γ coefficients were not significantly different in strength from each other ($p > 0.05$). Estimated unstandardized intercept, parameters, standard errors, and confidence intervals are displayed as Model 1 in Table 4.6.

As a final model (Model 2), a random-intercepts coefficient model was tested to predict intentions to implement from expectancy, value, cost, and master's degree, as

before, with the addition of an expectancy X value interaction term. To calculate the interaction term, expectancy for success and value were group mean centered before the interaction term was calculated. The interaction term was then not re-centered in the HLM analysis. As before, expectancy for success, value, cost (reverse scored), and master's degree continued to predict intentions to implement (Model 2, Table 4.7). The expectancy X value interaction term was not a significant predictor of participants' intentions to implement, however ($p = 0.251$). Expectancy and value predicted a greater portion of the variance in intentions to implement than cost ($p < 0.05$). These predictors explained 36% of the variance in teachers' intentions to implement ($R^2 = 0.355, p < 0.01; \tau_{00} = 0.084; \sigma^2 = 0.445$).

Table 4.6

Teachers' Intentions to Implement Predicted by Teachers' Motivation

Predictors	Intentions to Implement					
	Model 1			Model 2		
	<i>B</i>	<i>SE</i>	95% C.I.	<i>B</i>	<i>SE</i>	95% C.I.
Intercept (γ_{00})	8.52***	0.04		8.49***	0.05	
Expectancy (γ_{10})	0.30***	0.07	[0.18 – 0.50]	0.38***	0.08	[0.21 – 0.50]
Value (γ_{20})	0.41**	0.16	[0.12 – 0.72]	0.53**	0.07	[0.38 – 0.68]
Cost ^[R] (γ_{30})	0.08***	0.02	[0.03 – 0.13]	0.08***	0.02	[0.03 – 0.12]
Master's degree (γ_{40})	0.13**	0.05	[0.04 – 0.22]	0.14**	0.05	[0.05 – 0.23]
E X V interaction (γ_{40})				0.09 ^{ns}	0.07	[-0.05 – 0.23]

Note. $n = 645$; $j = 64$; ^[R] = reverse scored; ^{ns} = non-significant; ** $p < 0.01$; *** $p < 0.001$; Master's degree coded 1/0; group-mean centered; unstandardized parameters.

The unstandardized estimate of the intercept ($\gamma_{00} = 8.49$, 95% CI [8.39, 8.59], $p < 0.0001$; possible range 1.0 – 9.0) indicated that on average, teachers intended to implement what they had learned in the professional development. In an unconstrained model with random intercepts and fixed slopes, using group mean centering, the intercept is interpreted as the expected outcome for an individual with a score equal to the group mean on all predictor variables.

Self-reported implementation

Multiple regression analyses were used to test the relationship between teachers' motivation to implement the professional development immediately following the summer training and their self-reported implementation in the fall semester. Initially, self-reported implementation was regressed on a host of demographic predictors as before in the HLM analysis (i.e., years teaching, gender, teaching role, Hispanic, white, traditional teaching preparation, master's degree). None were significant ($p > 0.05$). A second model was tested predicting self-reported implementation from expectancy, value, cost, and the interaction of expectancy and value. No covariates significantly predicted self-reported implementation, and the overall model failed to explain a portion of the variance in the outcome variable ($R^2 = 0.08$, $p = 0.334$). Estimated unstandardized intercept, parameters, standard errors, and confidence intervals for these non-significant models are displayed in Table 4.7.

Table 4.7

Teachers' Self-reported Implementation Predicted by Teachers' Motivation

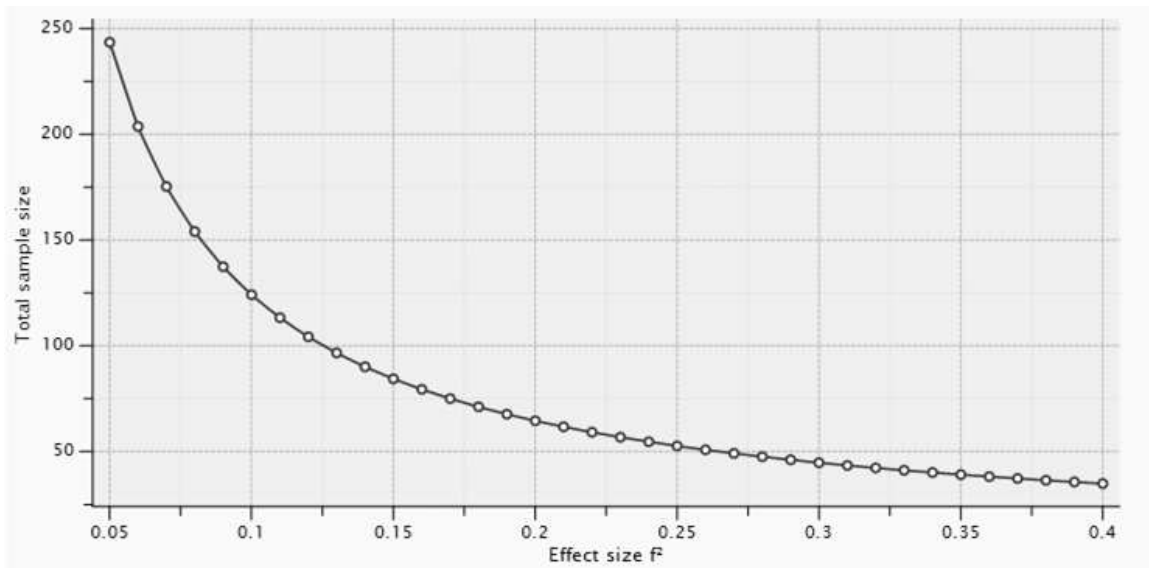
Predictors	Self-reported Implementation					
	Model 1			Model 2		
	<i>B</i>	<i>SE</i>	95% C.I.	<i>B</i>	<i>SE</i>	95% C.I.
Intercept	4.24 ^{***}	0.15		4.20 ^{***}	0.23	
Expectancy	0.64 ^{ns}	0.41	[-0.19 – 1.46]	0.60 ^{ns}	0.44	[-0.28 – 1.49]
Value	-0.11 ^{ns}	0.48	[-1.06 – 0.85]	-0.05 ^{ns}	0.54	[-1.13 – 1.04]
Cost	0.05 ^{ns}	0.08	[-0.11 – 0.20]	0.05 ^{ns}	0.08	[-0.11 – 0.20]
E X V interaction				0.21 ^{ns}	0.90	[-1.59 – 2.00]

Note. $n = 63$. ^{ns} = non-significant; ^{***} $p < 0.001$; predictors grand-mean centered; unstandardized parameters.

Considering the small sample size ($n = 63$) in this analysis, statistical power analysis was conducted post hoc in G*Power (Version 3.1.9.2). A sample size of 143 would be needed to detect an effect of $R^2 = 0.08$, assuming typical error probability ($\alpha = 0.05$) and recommended power (0.80) with four predictors (i.e., expectancy, value, cost, expXval). Figure 4.2 displays the relationship between total effect size (f^2) and the total sample size needed to detect that effect size. Post hoc sensitivity analyses indicated that with this regression model, a sample size of 63 was likely to detect effects greater than $R^2 = 0.17$.

Figure 4.2

Power analysis for given effect sizes (f^2) in a multiple regression model with four predictors, $\alpha = 0.05$, power = 0.80.



RESEARCH QUESTION 2

Do teachers' emotions moderate the relationship between motivation and implementation?

To understand how participants' emotional experiences moderated the relationships between motivation and implementation, a second series of hierarchical linear models was tested before testing a set of single-level multiple regression models.

Implementation intent

Initially, a random coefficients model was tested without any motivation X affect interaction terms. As before, master's degree was entered as a predictor in the model. All covariates were group mean centered. Estimated intercept, parameters, and standard errors are displayed as Model 1 in Table 4.7. The intercept remained high ($\gamma_{00} = 8.52$, 95% CI [8.39, 8.59], $p < 0.0001$), indicating that "average" teachers in each group were highly motivated. Expectancy for success, cost (reverse scored), and pleasant affect predicted teacher's intentions to implement. Value was unexpectedly non-significant ($\gamma_{20} = 0.16$, 95% CI [-0.06, 0.35], $p = 0.16$), as was unpleasant affect ($\gamma_{50} = -0.02$, 95% CI [-0.11, 0.06], $p = 0.60$). The problems with measurement error surrounding the unpleasant affect scale (see multi-level confirmatory factor analysis) may explain, in part, the nonsignificant effect of unpleasant affect on participants' implementation intentions. This model predicted 41% of the variance in teachers' intentions to implement ($R^2 = 0.41$, $p < 0.01$; $\tau_{00} = 0.074$; $\sigma^2 = 0.411$).

A second random-coefficients model was tested, predicting intentions to implement from expectancy for success, value, cost, and pleasant and unpleasant affect, as before. This second model also included the interaction effects of motivation and pleasant affect. To create the interaction term, teachers' raw scores on expectancy for success (three items), value (three items), and cost (reverse scored; three items) were averaged to estimate motivation.² The motivation score and pleasant affect score were group-mean centered before an interaction term was created (i.e., motivation X pleasant affect). The interaction term was entered into the model and not re-centered. Model estimates and standard errors are displayed as Model 2 in Table 4.8. The final model predicted 44% of the variance in educators' intentions to implement ($R^2 = 0.44$, $p < 0.01$, $\tau_{00} = 0.060$; $\sigma^2 = 0.391$).

² Multi-level confirmatory factor analyses provided confidence that expectancy, value, and cost items measured distinct factors that significantly loaded on the broader latent factor, motivation.

Table 4.8

Teachers' Intentions to Implement Predicted by Teachers' Motivation, Affect, and the Interactions of Motivation and Affect

Predictors	Intentions to Implement					
	Model 1			Model 2		
	<i>B</i>	<i>SE</i>	95% C.I.	<i>B</i>	<i>SE</i>	95% C.I.
Intercept (γ_{00})	8.52***	0.04		8.56***	0.05	
Expectancy (γ_{10})	0.28***	0.06	[0.16 – 0.40]	0.24***	0.06	[0.12 – 0.36]
Value (γ_{20})	0.21 ^{ns}	0.16	[-0.09 – 0.52]	0.18 ^{ns}	0.14	[-0.09 – 0.45]
Cost ^[R] (γ_{30})	0.05*	0.04	[0.01 – 0.10]	0.05*	0.02	[0.00 – 0.10]
Pleasant affect (γ_{40})	0.21***	0.04	[0.13 – 0.29]	0.15***	0.03	[0.09 – 0.22]
Unpleasant affect (γ_{50})	-0.04 ^{ns}	0.08	[-0.20 – 0.11]	-0.04 ^{ns}	0.08	[-0.18 – 0.11]
Master's degree (γ_{60})	0.11**	0.05	[0.01 – 0.21]	0.07 ^{ns}	0.05	[-0.05 – 0.17]
M X P interaction (γ_{60})				-0.12**	0.04	[-0.20 – -0.05]

Note. $n = 643$; $j = 64$; ^[R] = reverse scored; ^{ns} = non-significant; * $p < 0.05$; ** $p < 0.01$;

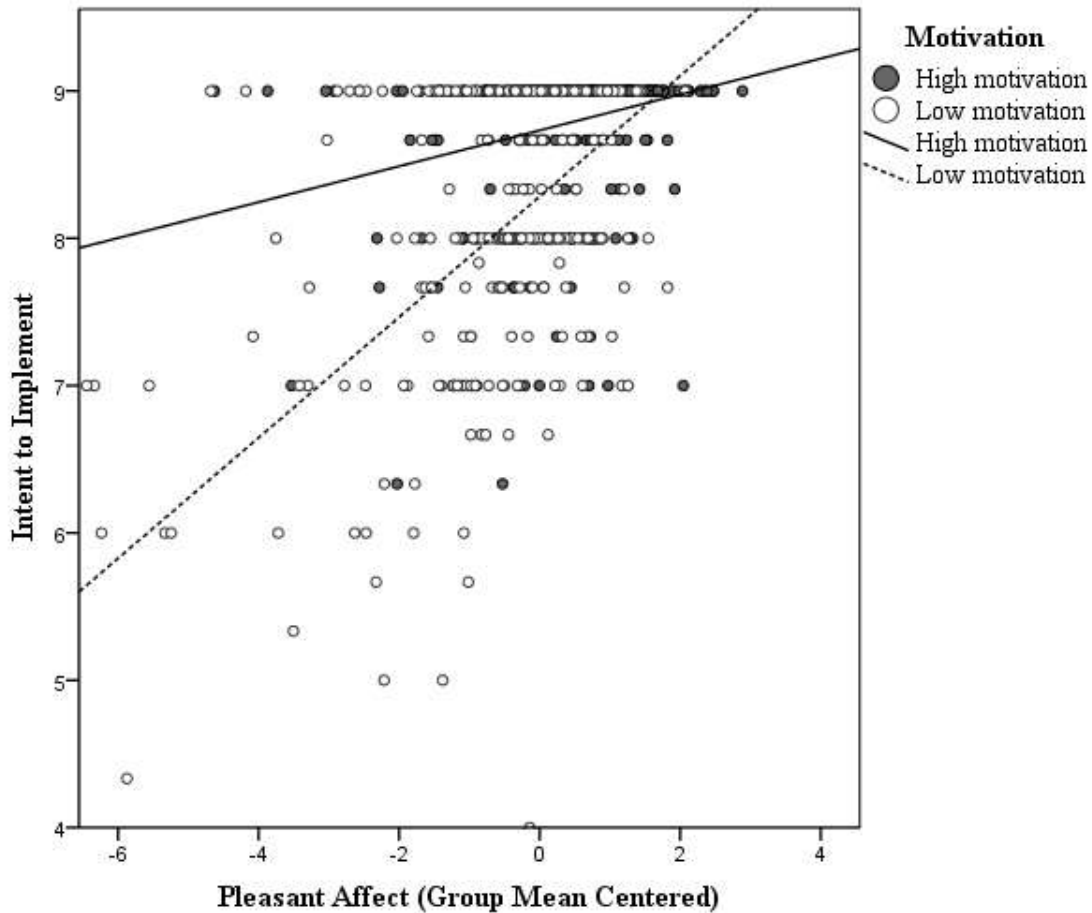
*** $p < 0.001$; Master's degree coded 1/0; group-mean centered; unstandardized parameters.

Expectancy for success, cost, and pleasant affect continued to predict intentions to implement significantly, whereas value and unpleasant affect remained non-significant ($p > 0.05$). The motivation X pleasant affect interaction term, an estimation of the multiplicative effects of emotion and motivation (Fredrickson, 2001), was significant ($\gamma_{60} = -0.23$, 95% CI [-0.36, -0.10], $p < 0.01$). To interpret this interaction effect, it is important to remember that motivation and pleasant affect were group mean centered.

Positive scores on motivation and pleasant affect indicated individuals whose motivation or affect were greater than their group's (i.e., training) average. Although this relationship was significant, it was qualitatively different than was hypothesized. For teachers with *lower* than group average motivation (i.e., negative), there was a stronger relationship between pleasant affect and intentions to implement. This relationship can be seen in Figure 4.3, which displays the bivariate correlation between pleasant affect (group mean centered) and intentions to implement, grouped by teachers with higher than group average motivation (represented by grey circles and dark line of best fit) and teachers with lower than group average motivation (represented by white circles and dashed line of best fit). Ceiling effects may have limited the range of participants' responses, as many participants selected the maximum response on intent to implement on all three items (i.e., 9 out of 9). This model explained 44% of the variance (Level 1) in teachers' intentions to implement ($R^2 = 0.442$, $p < 0.001$; $\tau_{00} = 0.060$; $\sigma^2 = 0.391$).

Figure 4.3

Relationship between pleasant affect and intent to implement, as moderated by motivation (high motivation > 0, low motivation <0).



Self-reported implementation

Participants' self-reported implementation in the fall semester was predicted in a single-level model from participants' motivation, affect (i.e., pleasant, unpleasant), and the interactions of motivation and affect (i.e., motivation X pleasant, motivation X unpleasant). All predictor variables were measured in the summer immediately following

participants' professional development training. Prior analyses indicated that no demographic variables significantly predicted participants' self-reported implementation (see Research Question 1). As such, these variables were not considered in these analyses. An initial model was tested, predicting self-reported implementation from expectancy, value, cost, pleasant affect, and unpleasant affect. A second model adding the interaction effects (i.e., motivation X pleasant affect, motivation X unpleasant affect) was then tested. Both models failed to predict a significant amount of the variance in self-reported implementation ($R^2 = 0.11, p = 0.22$; $R^2 = 0.13, p = 0.37$, respectively). All predictor variables were non-significant in both models. Estimated unstandardized intercept, parameters, standard errors, and confidence intervals for these non-significant models are displayed in Table 4.9.

Table 4.9

Teachers' Self-reported Implementation Predicted by Teachers' Motivation, Affect, and the Interactions of Motivation and Affect

Predictors	Self-reported Implementation					
	Model 1			Model 2		
	<i>B</i>	<i>SE</i>	95% C. I.	<i>B</i>	<i>SE</i>	95% C. I.
Intercept	4.20 ^{***}	0.16		4.15 ^{***}	0.18	
Expectancy	0.15 ^{ns}	0.51	[-0.87 – 1.18]	0.21 ^{ns}	0.52	[-0.83 – 1.25]
Value	-0.09 ^{ns}	0.59	[-1.07 – 0.90]	-0.13 ^{ns}	0.51	[-1.15 – 0.88]
Cost ^[R]	0.02 ^{ns}	0.08	[-0.14 – 0.18]	-0.02 ^{ns}	0.09	[-0.21 – 0.17]
Pleasant affect	0.28 ^{ns}	0.18	[-0.08 – 0.64]	0.30 ^{ns}	0.18	[-0.07 – 0.67]
Unpleasant affect	-0.20 ^{ns}	0.28	[-0.76 – 0.37]	-0.12 ^{ns}	0.33	[-0.78 – 0.54]
M X P interaction				0.16 ^{ns}	0.20	[-0.24 – 0.56]
M X U interaction				0.12 ^{ns}	0.33	[-0.54 – 0.78]

Note. $n = 63$. ^{ns} = non-significant; ^{***} $p < 0.001$; ^[R] = reverse scored; predictors grand-mean centered; unstandardized parameters.

Post hoc power analyses were conducted for both models in G*Power, assuming a power of 0.80 and alpha of 0.05. Analyses revealed that sample sizes closer to 107 were necessary to detect smaller effect sizes such as these. Post hoc sensitivity analyses indicate that with a sample size of 61, multiple regression analyses with five and seven predictors ($\alpha = 0.05$, power = 0.80) would be likely to detect effect sizes that were greater than $R^2 = 0.19$ and $R^2 = 0.21$, respectively.

RESEARCH QUESTION 3

What is the relationship between cognitive factors (i.e., knowledge and efficacy) and motivation?

To examine the relationships between teachers' knowledge and efficacy, and their motivation to implement, a series of hierarchical linear models were tested, an unconditional (null) model, a demographic predictors model, and two random coefficients models (one with teachers' efficacy and one without). Motivation was calculated as before, the average of all nine motivation items, three expectancy, three value, and three cost (reverse scored).

An intercepts-only model indicated that 5% of the variance could be explained by between group differences, whereas 95% was due to within group variance ($ICC = 0.05$). With an average cluster size of 10.5, the design effect was calculated to be 1.48, less than the recommended threshold of 2.0 (Heck & Thomas, 2015; Muthén & Satorra, 1995). These analyses indicated that single level models may be unbiased methods for estimating regression parameters. Despite this, however, the nested nature of these data compelled me to analyze the data using hierarchical methods.

Motivation was regressed in a hierarchical model on all demographic variables as before (i.e., years teaching, gender, teaching role, Hispanic, white, traditional teaching preparation, master's degree). All demographic variables were entered at once and were group-mean centered. Hispanic, a dichotomous variable (1 = Hispanic, 0 = not Hispanic), significantly predicted motivation ($\gamma_{10} = -0.12$, 95% CI [-0.23, -0.01], $p < 0.05$). All other

demographic variables were non-significant ($p > 0.05$) and were dropped from subsequent analyses.

An initial random-coefficients model was estimated, predicting teachers' motivation to implement (i.e., expectancy, value, and cost) from teachers' estimations of their knowledge prior to arriving at the professional development training and the difference between that estimation and their estimation of current knowledge (i.e., knowledge gain). Model estimates are displayed in Table 4.10. All covariates at Level 1 were group mean centered. Although the model explained only 11% of the variance in teachers' individual motivation to implement ($R^2 = 0.112$, $p < 0.01$; $\tau_{00} = 0.030$; $\sigma^2 = 0.420$), all predictors significantly predicted ($p < 0.001$) teachers' motivation to implement. The estimate of the intercept was also high ($\gamma_{00} = 6.38$, 95% CI [6.31, 6.45], $p < 0.001$), indicating that a teacher participant who scored average on all covariates would likely be highly motivated (scale, 1 to 7).

Table 4.10

Teachers' Motivation to Implement Predicted by Prior Knowledge and Knowledge Gain

Predictors	Motivation		
	Coefficient	SE	95% C.I.
Intercept (γ_{00})	6.38***	0.04	
Prior knowledge (γ_{10})	0.42***	0.09	[0.24 – 0.61]
Knowledge gain (γ_{20})	0.37***	0.08	[0.23 – 0.51]
Hispanic (γ_{30})	-0.26***	0.04	[-0.39 – -0.13]

Note. $R^2 = 0.11$; $n = 599$; $j = 63$; *ns* = non-significant; *** $p < 0.001$; Hispanic coded 1/0; predictors group-mean centered; unstandardized parameters.

A second random-coefficients model was tested, predicting motivation from prior knowledge and knowledge gain, as before, along with estimates of teachers' general efficacy for teaching (Teacher Sense of Efficacy Scale; TSES). A subsample of participants were not presented the TSES, and there was, therefore, a large amount of missing data. The sample size dropped ($n = 222$) along with the number of observed groups ($j = 35$) and average cluster size (M cluster size = 6.34). The ICC for motivation was 0.02, indicating that little to none of the variance in teachers' responses was explained by between group variance. The design effect was 1.11, well below 2.0. It is likely, therefore, that single-level modeling of these data would not result in a highly inflated standard errors, and an increased probability of committing a Type I error. Despite these analyses, however, the nested nature of these data suggests that HLM may

be theoretically most appropriate. Sample *Mplus* code for these hierarchical linear models is included in Appendix D.

The random-coefficients model significantly predicted about 23% of the variance in teachers' individual motivation to implement what was learned in their professional development training ($R^2 = 0.228$ $p < 0.01$; $\tau_{00} = 0.013$; $\sigma^2 = 0.516$). Model estimates are displayed in Table 4.11. General teaching efficacy was the largest predictor of motivation, whereas knowledge gain remained a significant predictor. However, prior knowledge was not a significant predictor of motivation ($\gamma_{10} = 0.24$, 95% CI [-0.11, 0.58], $p = 0.187$).

Table 4.11

Teachers Motivation to Implement as Predicted by Prior Knowledge, Knowledge Gain, and General Teaching Efficacy

Predictors	Motivation		
	<i>B</i>	<i>SE</i>	95% C.I.
Intercept (γ_{00})	6.30***	0.05	
Prior knowledge (γ_{10})	0.29 ^{ns}	0.22	[-0.13 – 0.71]
Knowledge gain (γ_{20})	0.33*	0.13	[0.07 – 0.60]
General teaching efficacy (γ_{30})	0.33***	0.07	[0.19 – 0.47]
Hispanic (γ_{40})	-0.15***	0.10	[-0.39 – 0.04]

Note. $R^2 = 0.23$; $n = 222$; $j = 35$; ^{ns} = non-significant; * $p < 0.05$; *** $p < 0.001$; Hispanic coded 1/0; group-mean centered; unstandardized parameters.

Chapter Five: Discussion

In this chapter, I discuss the findings from study and relate them to the existing literature. Following this, I discuss the limitations that apply to any conclusions that can be drawn from the findings. Finally, I discuss implications for future research and recommendations for practitioners.

CONNECTING MAIN FINDINGS TO THE EXISTING LITERATURE

I organize this section by first addressing the main findings of this study as hypothesized, followed by a discussion of unexpected findings and of methodological contributions. For the purposes of discussion, I organized the main findings into three groups: describing teachers' experiences in PD, predicting participants' intentions to implement what they have learned, and predicting participants' motivation to implement.

Educators' experiences across contexts

For the most part, the nearly 700 participants reported being happy during their varied professional development experiences, of which there were 64 and motivated to implement what they had learned. Analysis of teachers' emotional and motivational experiences during professional development has rarely been reported with large nested data sets such as these (see Karabenick & Conley, 2011; Karabenick & Noda, 2010). Although there was variance across participants' experiences, most of this variance was

explained by differences between individual educators' experiences, rather than by training-level differences.

Pleasant experiences

Participants had pleasant affective experiences and, in general, left their professional development intending to implement what they had learned. The finding that educators were motivated to implement and had pleasant experiences during PD, runs counter to a common narrative in teaching: that professional development is an excruciating affective experience from which little to no motivated behavior arises. Although the dominant narrative, commonly discussed by practicing educators (McClintock, 2014; Schmoker, 2015; Simmons, 2016; Wonderland, 2014), is supported by some qualitative research (Darby, 2008; Saunders, 2013, Saunders, Parsons, Mwavita, & Thomas, 2015), other researchers have found that teachers' emotional experiences during professional development are largely pleasant (Jeffrey & Woods, 1996; Little & Bartlett, 2002). In my sample, educators' experiences during professional development were largely pleasant and motivated. Continued research on teachers' affective experiences in professional development is warranted, including research to synthesize systematically the extant qualitative and quantitative research on teachers' affective experiences in professional development.

Individual- and group-level variance

I had theorized that differences in educators' affective experiences could be largely explained by differences across in the trainings that educators experienced. Mine

is the only study that I could find that explored a large sample of teachers and their motivational and emotional experiences in professional development, across a large number of trainings. Although educators' experiences were largely pleasant, some variance did exist across their experiences. However, individual level differences explained the vast majority of the variance in participants' affect and motivation, whereas local contexts (i.e., trainings) did not explain a considerable portion of the variance (ICCs in unconditional models ranged from 0.04 to 0.17). Although some research has indicated that teachers' emotional reactions are largely dependent on the nature of professional development programs (Darby, 2008; Lasky, 2005; Reio, 2005), the variance in the present study indicates that educators' emotional and motivational experiences surrounding professional development are not largely predicted by contextual factors but rather by educators' individual interpretations of these contextual experiences. Aligning with this finding, Saunders (2013) conducted a qualitative study of teachers' emotional experiences during professional development, and found that teachers' emotional experiences were "highly personal" and were less dependent on context than on individuals' experiences (p. 328).

A growing number of researchers have posited that teachers' emotional and motivational experiences exist as the result of multiple interacting systems (Frenzel, 2014; Sutton & Wheatley, 2003; Schutz, 2014; Zembylas, 2005). At a minimum, these systems include the local context (e.g., the training) and teachers' individually held needs, goals, and values. It seems that, in educators' professional development experiences, educators' individual backgrounds and experiences play a dominant role in

emotional and motivational experiences (Cross & Hong, 2009; Hargreaves, 2001; Saunders, 2013; Zembylas, 2003). Low ICCs may indicate that many educators were motivated to implement *something* from their professional development experience – no matter the alignment of the context to their professional development needs or values. In contrast, other educators in these exact same professional development experiences were not motivated by the experience. In this way, educators’ emotional and motivational experiences are not entirely independent of the professional development context (Wieczorek & Theoharis, 2016). However, in this study, teachers’ individual backgrounds were varied enough across the number of trainings that their individual differences may have contributed more to the variance in motivation and emotion.

Beyond the context of the professional development and teachers’ individual characteristics, Schutz (2014) proposed that teachers’ emotional experiences also emerge from the larger socio-historical contexts associated with teachers’ professional development. Saunders (2013) found that some teachers’ perceived that there was a great degree of commonality across all of their affective experiences during professional development, with one participant noting that, “*you go up and down with your emotion ... It’s just the normal flow.*” The interactions of the socio-historical contexts surrounding professional development and teachers’ emotional and motivation experiences are largely unexplored. Perhaps the dominant narrative – that professional development experiences are largely unpleasant and not useful – serves to lower teachers’ expectations and goals for professional development. Thus, when the experience is not entirely unpleasant and slightly useful, teachers appraise the context positively resulting in pleasant affect and

positive intentions. More research exploring the socio-historical roots of teachers' emotional experiences during professional development is warranted, especially as researchers continue to explore the antecedents to teachers' affective experiences during professional development.

In this study, many participants were able to choose the professional development trainings that they attended. Educators' estimations of their knowledge before the professional development (i.e., Pre-Knowledge) was the largest ICC of all latent variables measured in this study, although it was still relatively small. Seventeen percent of the variance in Pre-Knowledge was explained by training-level differences (ICC = 0.17). This may indicate that some teachers considered their prior knowledge as they choose which training to attend. (Yet, teachers' estimations of their prior knowledge did not correlate with self-reported implementation.)

There is evidence that professional developments that are aligned with teachers' beliefs and values may induce positive emotions such as hope and inspiration and may support educators' value for implementing the professional development (Saunders, 2013). It is especially interesting, therefore, that the value ICC was so low in this sample (ICC = 0.07), indicating that 93% of the variance was explained by individual-level differences, rather than training-level differences. I had hypothesized that educator's estimations of value would be highly dependent on the nature of the PD contexts and the interaction of the PD context with teachers' individual experiences. If teachers were to experience a professional development that met their needs (e.g., they learned how to do something that they could not previously do; utility value) or aligned with the

professional values (e.g., provided evidence to support practices they were already engaged in; attainment value) they would value implementing the training. If the training context did not meet these needs or align with their values, they would not value implementing. Alternately, the low ICC in this sample indicated that differences in participants' estimations of value for implementing a professional development were largely explained by individual-level variance. This may indicate that educators' estimations of value are less associated with training-level characteristics and are more associated with individual-level characteristics such as educators' personal beliefs and values, interests, and individual pedagogical needs. For example, a teacher may approach a poorly designed training that aligns with their personal beliefs and values (attainment value), and find use (utility value) for implementing. Alternately, another teacher may approach the same poorly designed training, discover that the PD does not align with their personal beliefs and values, and find little value in implementing what was discussed in the PD. Educators' motivational and emotional experiences, therefore, seem to be highly personal and more associated with the individual variance that exists between educators than with the variance that exists between trainings.

Predicting intentions to implement

Two research questions in this study were focused on the motivational and emotional characteristics that would be associated with educators' intentions to implement what was learned immediately following the professional development experience. The following section briefly reviews the findings related to predicting

participants' intentions to implement. Then, I discuss the relationships between hypothesized predictors (e.g., expectancy, value, cost, pleasant affect) and educators' intentions to implement.

Educators' intentions to implement what was learned in professional development, as measured immediately following the PD training, were predicted by their motivation. As hypothesized, participants' expectancy for success when implementing, their value for implementing, and their estimations of the perceived costs each predicted their intentions to implement. Participants' estimations of their expectancy for success when implementing and their value to implement were significantly stronger predictors of implementation intent than participants' estimations of cost. Immediately following the summer PD experience, these educators considered the likelihood that they could do what was being asked of them (i.e., expectancy) and their value for doing so more than they considered the perceived costs. Participants' pleasant affective experience also predicted intentions to implement, above and beyond participants' expectancies, values, and costs, as did the interaction of pleasant affect and motivation.

Expectancy for success when implementing

Participants' estimations of their expectancy for success in implementing were an especially powerful predictor of intended implementation. Educators who believed they could implement, reported intending to implement. Expectancies for success were stronger predictors of implementation intent than estimations of cost. When predicting educators' intentions to implement from their affective states *and* their motivational

states, analyses indicated that expectancy for success was the most salient motivational factor. This finding aligns with extant research on teachers' motivational experiences following professional development, indicating that expectancies for success and sense of self-efficacy were powerful predictors of actually implementing new strategies (Abrami et al., 2004; Chitpin, 2011; Foley, 2011; Wozney et al, 2006).

Value for implementing

Value was an important motivational factor in predicting educators' intentions to implement following a professional development. However, participants' estimations of value were not significant predictors of their intentions to implement, after accounting for participants' pleasant affect. Value was closely associated with educators' pleasant affective experiences ($r = 0.58$), and the close intra-individual relationship between pleasant affect and value may have blurred my ability to reliably measure the unique effects of value on participants' intentions to implement. For example, a teacher may encounter a new strategy in training, immediately recognize the usefulness of the strategy, and become excited to implement. It is possible that teachers do not distinguish between their estimations of value (i.e., attainment value, intrinsic value, utility value) to implement and their pleasant affective experiences. In addition, value was measured in my study by an item estimating intrinsic value for implementing the training (i.e., "*I am excited to put this training into place.*"). Administered immediately following the summer PD, this item may have also measured participants' estimations of their pleasant

affect in the moment. It may have been difficult for the items on the questionnaire to distinguish clearly between participants' pleasant affect and their value for implementing.

Pekrun (2006) postulated that in academic situations (and I would assert that professional development is an academic situation) estimations of control, or expectancy for success, and value may directly cause pleasant and unpleasant emotional experiences. Although this relationship was not experimentally manipulated in my study, the strong correlations between pleasant affect and expectancy ($r = 0.48$) and value ($r = 0.58$) provide support for the strong relationships between motivation and emotion.

Research involving teachers' emotions and motivation during professional development indicates that a strong link exists between *value* and *emotion*, rather than between *emotion* and *expectancy*. In two qualitative studies, Lee and Yin (2011; Yin & Lee, 2011) found that educators whose personal values aligned with the values embedded in a curricular change were happy as they implemented. Saunders (2013) found that lack of alignment induced strong unpleasant emotions. In a quantitative study, Osman et al. (2016) found that value was the strongest predictor of teachers' pleasant emotions during trainings. For educators in professional development, there are strong associations between individuals' estimations of their value and their pleasant affective experiences. Despite this strong connection, value appears to play a role in educators' intentions to implement what they learned during a professional development experience.

Perceptions of cost while implementing

Suppressed estimations of cost may have weakened the relationship between cost and implementation intent. For educators estimations of cost may be inflated during the school year and deflated during the summer. During the school year, teachers have strong understandings of what must be given up in order to implement anything new in their teaching. Some expectancy-value researchers refer to this form of cost as “loss of valued alternatives,” in that engaging in one activity prevents individuals from engaging in another valued activity (Barron & Hulleman, 2015; Flake et al., 2015). For example, teachers who are asked to teach something new have higher estimations of the cost to do so, as they often feel that they are replacing curriculum that they enjoy. These estimations of cost can directly lead to experiences of anxiety and frustration (Lee & Yin, 2011). However, the participants in the present study were participating in summer PD trainings and the perceived costs for implementing the professional development for participants would likely have been born several months in the future, during the school year. This may have suppressed participants’ estimations of those costs, as individuals often underestimate the potential costs of future actions (Sanna, Panter, Cohen, & Kennedy, 2011).

I had theorized that participants’ estimations of cost would have been highly contingent on the context of their professional development experience. Trainings are varied in their difficulty to implement – one training might ask participants to revolutionize their teaching practices totally, whereas another may be rather easy to implement. One might think therefore, that teachers’ estimations of cost would be highly

context or training dependent. However, participants' estimations of cost were most explained by individual level variance, rather than training-level variance. Individual level differences explained 96% of the variance in these educators' estimations of cost (ICC = 0.04). This low ICC may indicate one of two possibilities. Within a single training, the *actual* costs bore across educators are different. For example, more experienced teachers may be able to implement new curricula with ease whereas younger teachers may bear greater costs when implementing. Alternatively, the low ICC may indicate that within a single training educators' actual costs remain constant whereas educators' *perceived* costs may vary across individuals. The curriculum and instruction implemented, support provided, and expectations are the same for a single training (i.e., actual costs), however, teachers with varying teaching efficacy and experience may perceive these actual costs differently.

It is unclear, then, if cost should be considered a separate construct from value and expectancy. The bivariate correlations between cost and expectancy ($r = 0.24$) and value ($r = 0.24$) were relatively low, suggesting that the three items on the cost scale were likely measuring different constructs from the three expectancy and three value items. In addition, the factor loadings in the multi-level CFA denoted that the cost items did not cross-load on the expectancy or value factors, again indicating that the cost items were measuring separate constructs from expectancy and value. Cost appears to be a separate construct from value and expectancy. However, it is not clear if it plays a prominent role in educators' intentions to implement what was learned in a summer PD. More research on educators' estimations of costs during professional development is needed.

Pleasant affect while in professional development

This study provides additional evidence that emotions are intertwined with motivation. Above and beyond participants' estimations of their motivation, educators' pleasant affect played an important role in their intentions to implement what was learned in the PD. Educators may consider the pleasant affect they had while in PD when deciding to implement (i.e., "*I had fun learning this, I bet I will have fun implementing it with students*"). This aligns with previous research, in that pleasant emotional experiences during professional development are associated with teachers' implementation afterwards (Gallo, 2016; van Veen & Slegers, 2006).

For many teachers, contributing to students' growth is a rewarding pleasure inducing process (Dörnyei & Ushioda, 2011). In addition, when educators anticipate future implementation, believing that implementation will contribute to students' growth, they may also experience pleasure. It is possible, therefore, that teachers' positive intentions to implement are highly predicted by educators' pleasant emotions because educators' intentions to implement can induce pleasant emotional states in educators (Gallo, 2016). As this study is cross-sectional and not experimental, it is not possible to tease apart the directionality of these relationships in these data but the suggestion that a relationship exists seem warranted.

Multiplicative effects of motivation and pleasant affect

When predicting participants' intentions to implement from their pleasant affect and motivation to implement, an interaction effect was found as hypothesized. However,

the nature of this interaction effect was different than hypothesized. Based on Fredrickson's (2001) "broaden and build" theory, I had hypothesized that experiencing pleasant emotional experiences during a professional development would increase educators' sense of efficacy to implement (rather than a sense of value; Fredrickson, 2015). This strong sense of efficacy might be then an "enduring resource" from which teachers could draw when implementing.

In this study, however, for educators who were less motivated to implement, pleasant affect played an important role in their intentions to implement. In contrast, for participants who were highly motivated, pleasant affect was less predictive of intentions to implement. In this way, one might think that for educators in professional development pleasant affective experiences broaden their thinking about implementation and builds their efficacy to implement – to a point. Perhaps educators in professional development never achieve the level of happiness that participants experienced in Fredrickson's studies on mindfulness and relaxation. It is also possible that variance in participants' responses was limited by ceiling effects, as raw scores were negatively skewed and many participants responded to pleasant affective items and motivational items with the highest possible rating. Despite the unanticipated nature of the interaction effect, the multiplicative effects associated with educators' pleasant affect and motivation in professional development are worthy of continued study.

Predicting educators' motivation to implement

Participants' estimations of expectancy, value, and cost – their motivation to implement – predicted their intentions to implement. What factors, then, predicted their motivation to implement? In this section, I discuss three predictors of educators' motivation to implement what was learned in their professional development experiences: their prior knowledge, their knowledge gain, and their general teaching efficacy. Participants' motivation was significantly predicted by their prior knowledge of the content taught in the professional development and their estimation of knowledge gain over the course of the professional development experience. Above and beyond these predictors, however, some of the relationship between knowledge and motivation was explained by educators' general sense of teaching efficacy.

Estimations of prior knowledge

Educators' estimations of their prior knowledge played an important role in predicting their motivation to implement what was learned in the professional development. This aligns with previous research on students' expectancies for success, in that one of the key drivers' of students' sense of motivation derives from their prior knowledge and abilities (Jacobs et al., 2002; Wigfield et al., 1998; Wigfield et al., 2009). Educators' estimations of their prior knowledge, as measured in this study, were *context specific* prior knowledge. Participants estimated their knowledge of the content, strategies, and key aspects of the specific training they had attended. However, estimates

of context specific prior knowledge were not significant predictors above and beyond educators' general teaching self-efficacy.

Although educators' estimates of prior knowledge were correlated to some degree with their estimations of general teaching efficacy ($r = 0.20$), this correlation was not particularly strong. In this study, many participants held low estimations of context specific prior knowledge while holding higher estimates of their general teaching self-efficacy. In other words, these participants believed they were high-quality teachers but did not know much about the content of the professional development training before attending. As educators consider implementing and their motivation (expectancy, value, and cost) to implement what was learned in a PD, they consider the larger systems that effect implementation (e.g., curricula scope and sequence, student needs, available materials; Opfer & Pedder, 2011). Although prior knowledge of the PD plays an important role, educators' general teaching abilities and self-efficacy play a more dominant role in interacting with these systems and with educators' motivation to implement. For example, a highly efficacious teacher learning a new teaching skill may lack prior knowledge but understand how to implement (high expectancy for success) and understand the value of implementing (i.e., *"I didn't really know anything about this before, but now I think this will work well with my students."*). Alternately, a teacher with low teaching self-efficacy may attend a PD with content they are familiar with (high prior knowledge) and still not know how to implement (low expectancy for success) and lack value for implementing (i.e., *"These ideas aren't any better than what I did last year, and it didn't work well then, either."*). Although educators' prior knowledge of the content

taught in PD played a role in educators' motivation to implement, their general teaching self-efficacy played a more important role in that motivation.

Estimations of knowledge gain

Educators' estimations of the knowledge that they had gained during the professional development experience was an important predictor of their motivation to implement that knowledge. For those who did not believe that they had learned much, they were not motivated to implement much. Interestingly, there was not significant correlation between participants' estimations of their knowledge gain and their expectancy for successful implementation at the individual level ($r = 0.04$), but there was a significant and negative correlation between group level estimations of knowledge gain and group level expectancies for successful implementation ($r = -0.26$). In trainings that involved an estimation of greater knowledge acquisition, most educators in that training thought they were less likely to be able to implement the new knowledge. This was not the case at the individual-level, however. This aligns with previous qualitative research indicating that some teachers who encounter deep conceptual change, as would be indicated by a large self-reported learning gain, are likely to give up and not implement, whereas others immediately reach out for support from others (Gallo, 2016). In fact, Gallo's work may explain both the lack of an individual-level correlation and a negative group-level correlation in my study. Some individual educators were able to ask for support from their peers in the trainings (and received it), whereas others did not, explaining the lack of a significant individual level correlation. However, for those

educators who participated in trainings where a large majority of the teachers gained a great deal of knowledge, those groups of teachers were unable to receive support from each other within the training and as a group tended to be less likely to expect success when implementing.

The situation was reversed for value and cost, however. There were significant correlations at the individual level for teachers between knowledge gain and value ($r = 0.14$) and cost ($r = -0.13$). Across individual participants, those individuals who perceived that they had learned something, they were slightly more likely to value implementing what they learned and were less likely to perceive the costs of implementing. However, at the group level, trainings that involved a great degree of knowledge gain were not significantly correlated with an increased overall sense of value for implementing or an overall sense of decreased cost. Unlike expectancy for success, collective knowledge gain was not associated with collective value and collective cost.

Although individual-level knowledge gain was associated with motivation to implement, this finding should be tempered by the finding that training-level knowledge gain was negatively associated with training-level expectancy for success. If too many teachers in a training have great gains in knowledge and are unable to receive support for implementing from each other (as they are all newly acquiring knowledge) they are collectively less likely to expect success when implementing.

Estimations of general teaching efficacy

Participants' estimations of their efficacy for teaching were a strong predictor of their motivation to implement, above and beyond their prior knowledge and the amount of knowledge gained during professional development. This is in line with previous research on teachers indicating that teachers' self-efficacy for teaching is a key determinant of teachers' motivated behavior (Guskey & Passaro, 1994; Klassen & Tze, 2014; Tschannen-Moran & Woolfolk Hoy, 2001).

This also aligns with previous research on teachers in professional development, in that teachers with a strong sense of teaching self-efficacy have been reported to be more likely to implement professional development (Abrami et al., 2004; Reed, 2009). Teachers' self-efficacy is seen as a more stable characteristic that, although malleable, is more trait-like than state-like. It is not likely that teachers' self-efficacy can be easily manipulated in a daylong professional development experience (Klassen & Tze, 2014). Over time, professional development opportunities and successful implementation can likely build teachers' sense of self-efficacy. In contrast, teachers' motivation to implement is temporal and state-like. However, educators' teaching self-efficacy can support their state-motivation to implement. Teachers who believe that they are capable teachers and are confident in their abilities to teach all students well are more likely to believe that they can implement what was learned in a professional development (i.e., expectancy for successful implementation), more likely to value implementing, and have reduced estimations of the costs of implementing. Practitioners should consider activities

throughout the school year that can support teachers' self-efficacy for teaching and general teaching abilities (Klassen & Tze, 2014).

Unanticipated findings

Although most hypotheses in this study were supported, there were three unanticipated findings. The multiplicative effects of expectancy and value were not as hypothesized. In addition, the data gathering methods I employed did not enable me to capture teachers' self-reported implementation several months after their PD experience, nor reliably measure participants' experiences of unpleasant affect during the summer professional development.

The interaction of expectancy and value

The multiplicative effects of expectancy and value (ExV) on intentions to implement were not found in these data. In other words, I found that the effects of expectancy and value on intentions to implement were additive, with expectancy or value separately and independently predicting highly motivated behavior (Nagengast, Marsh, Scalas, Xu, Hau, & Trautwein, 2011). Although no expectancy-value researchers (that I am aware of) refute the existence of the expectancy-value interaction, some researchers have chosen to emphasize the additive nature of this relationship (Eccles et al., 1983; Eccles & Wigfield, 2002).

However, Nagengast and colleagues (2011) theorized that many researchers, including Eccles, failed to uncover ExV interactions because the statistical techniques

employed could not adequately detect interaction effects. Multiple regression techniques that contain measurement error may underestimate the size of interaction effects (Busemeyer & Jones, 1983), and structural equation modeling (SEM) of latent variables can help reduce this measurement error. Therefore, as an exploratory measure, I used single-level SEM to explore the possibility of the expectancy X value interaction. The findings were similar to those previously reported: there was no significant interaction effect.

These findings contribute to the ongoing discussion on the effects of expectancy and value. Continued research on the topic, along with synthesis work is warranted to help elucidate evidence that differences in interaction effects exist across contexts or categories of participants.

Teaching experience and motivated behavior

Research on teachers and on teachers in professional development consistently has indicated that experienced teachers interact with educational systems such as professional development differently than inexperienced teachers. Surprisingly, there were no significant relationships between the number of years a participant had been in education and any outcomes (i.e., intention to implement, motivation to implement). In addition, teachers' motivational and pleasant affective experiences were not different across number of years teaching.

This finding is unexpected and runs counter to extant research on teachers' affective experiences. Darby (2008) and Hargreaves (2005) found that experienced

teachers discussed being tired and emotionally drained, and often skeptical of new reforms initiatives. Hargreaves (2005) found that, by contrast, early career teachers seem to experience their work with emotional directness and intensity. In this study, however, less experienced educators were not more likely to experience pleasant emotions than more experienced educators were. It seems that, in the context of professional development trainings, experienced and inexperienced teachers have similar pleasant affective experiences.

Educators' intentions to implement and self-reported implementation were also not different for inexperienced and experienced educators. This finding runs counter to extant research on teachers' intentions to implement and their abilities to implement. There is research indicating that novice teachers may be less likely to transfer what was learned in professional development (Addy & Blanchard, 2010), whereas experienced teachers are more likely to implement what they have learned in professional development (Archambault & Barnett, 2010; Chitpin, 2011; Fedock, Zambo, & Cobern, 1996; Howland & Wedman, 2004; Shteiman, Gidron, Eilon, & Katz, 2010).

Participation was voluntary in many of the summer professional development trainings in this study. Therefore, many potential educators in these five school districts opted out of participation and did not attend these trainings. Although voluntary participants had relatively uniform experiences across their years of experience, potential participants who did not attend may have interacted with the trainings differently than those who voluntarily attended. Voluntary participation in professional development may enhance experienced educators' pleasant affective experiences in professional

development and diminish the negative effects of inexperience on teachers' motivation and implementation. The effects of teaching experience on teachers' motivational and emotional experiences in professional development remain an open question.

Self-reported implementation

The underpowered analyses used in this study failed to predict educators' actual implementation from their motivation or affective states immediately following a professional development experience. It is unclear why these relationships were non-significant. The lack of power to detect small effects was a likely contributor. In addition, however, there is evidence that one-time training such as these (i.e., trainings that last one day or less) are poor supports for teachers' authentic learning and actual implementation (Borko, 2004; Desimone, 2009; Opfer & Pedder, 2011; Rijdt et al., 2014). Although respondents reported a great degree of implementation, it is possible that their implementation was mostly supported by activities and supports independent of the summer trainings (e.g., instructional coaching, additional training, principal support).

Implementation of new learning is a cyclical process and is not linear (Opfer & Pedder, 2011; Saunders, 2013). Teachers' implementation moves forward and backwards in fits and spurts as teachers try to implement. Participants in this study reporting on actual implementation were midway through the fall semester and may not yet have been implementing what was learned or may already have implemented, failed, and taking a step back. Rijdt and colleagues' (2014) meta-synthesis on learning transfer following training indicated that measures taken 12 months after a professional development may

provide the most accurate measure of actual implementation. It appears that undulations in implementation are relatively stable by the 12-month marker.

The non-linear nature of teachers' learning and growth over time indicates that more longitudinal research on this topic is needed. Data gathering methods that employ regular measures of participants may be most effective when measuring teachers' attempts at implementation. Possible research methods that may thwart the difficulties encountered in this study include diary studies and experience sampling.

Unpleasant affect

Participants' estimations of their unpleasant affect were not reliably captured in this sample. It can be difficult for researchers to measure teachers' unpleasant affective experiences as teachers can often suppress expressing unpleasant emotions (Schultz, 2014). There are at least two reasons why teachers' self-reports of their unpleasant affect may have been especially susceptible to measurement error.

Teachers may have been unwilling to share negative emotional experiences via "cold" survey. Schutz (2014) outlined boundaries that can limit teachers' expression of emotions. Although several of these boundaries were initially developed to describe teachers' emotional interactions with their students (Aultman, Williams-Johnson, & Schutz, 2009), at least three of them are appropriate when considering teachers' interactions with researchers: relationship boundaries, communication boundaries, and emotional boundaries.

Teachers can develop *relationship boundaries* that serve to delimit appropriate boundaries for emotional expression with colleagues and educational professionals. Teachers may not reveal as much personal information about themselves to other education professionals (e.g., researchers), and questions about negative emotional experiences may be seen as invasive. For example, one participant in this study handwrote a note for researchers next to a negatively valenced item in the PANAS, “*None of your business!*,” and left the item blank.

In addition, teachers may place *communication boundaries* between themselves and others, choosing not to share unpleasant emotional experiences with those who are close to them. Educators are also often friends of professional development presenters and willing to share pleasant emotional experiences with them but less willing to share their unpleasant emotional experiences with friends. Despite attempts to reassure participants of confidentiality, teachers may also have been distrusting of district staff collecting surveys and of researchers analyzing these data.

Finally, these educators may have placed *emotional boundaries* that limited their expression of unpleasant emotions. Emotional boundaries can dictate which emotions are more socially acceptable to express in situations. For example, teachers in professional development might have felt that displaying some negative emotions (e.g., frustration) was more acceptable than displaying some of those in the PANAS (e.g., distressed, irritable, ashamed). These boundaries associated with teachers’ emotional experiences may have biased teachers’ responses to the unpleasant items in the PANAS, creating a data set that was especially positively skewed. On most of the “unpleasant” items (e.g.,

jittery, hostile, upset), almost all participants selected “1” on a scale of 1 to 9, and participants’ average response across the 10 items ranged from 1 – 4.2. No participant had an average unpleasant affect score greater than the midpoint (4.5) on the scale.

In addition, the PANAS is structured so that items alternate between pleasant and unpleasant items. The alternation pattern is inconsistent, however, and is not a predictable every-other item pattern. Teachers often take surveys at the end of trainings and many complete them quickly, leading to errors in their responses. Participant data were discarded if it was clear to me that someone had not read each item (e.g., selected all 20 PANAS items “9” simultaneously with one large penciled oval). Smaller selection errors may have occurred at the item level and these were not possible to identify. These measurement error problems may have contributed to unreliable estimates of teachers’ unpleasant affective experiences. These unreliable data then were faulty predictors of teachers’ intentions to implement.

Methodological contributions

The research methods employed in this study were unique for the field and are worthy of some discussion. In the following section, I discuss some of the methodological contributions of this study.

Multi-level confirmatory factor analysis of the recently developed Expectancy Value in Professional Development Scale (Osman & Warner, 2016; Warner & Osman, 2017) provides additional support for the three factor (i.e., expectancy, value, cost) structure of the scale. Significant correlations between the three factors and pleasant

affect (0.48, 0.58, -0.27, respectively), general teaching efficacy (0.45, 0.37, -0.19, respectively), intentions to implement (0.55, 0.57, -0.25, respectively), and knowledge of the PD content (0.40, 0.32, -0.15, respectively) support the predictive validity of the scale. Researchers and practitioners alike should consider use of the scale to measure teachers' motivation to implement what was learned during a professional development experience.

To capture participants' knowledge gains, participants completed a 5-item retrospective pre-post measure. Increasingly, retrospective pre-post assessments are administered in program evaluation research (Bhanji, Gottesman, Grave, Steinert, & Winer, 2012). The scales (i.e., pre-knowledge, post-knowledge, knowledge gain) performed well, as responses were normally distributed and internal consistency was high. The scales were each significantly correlated with hypothesized factors in the hypothesized directions, except for one – knowledge gain and expectancy for success. These findings indicate that retrospective pre-post assessments may be valid and reliable measures of teachers' estimations of their own learning.

LIMITATIONS

Several limitations should be kept in mind before generalizing from these findings. Participants' unpleasant affective experiences were not reliably captured in this study. Unpleasant affective experiences are personally enacted and individually experienced. Because of this, they can be personal experiences for teachers, experiences they may not be willing to report to strangers (Schutz et al., 2007; Zembylas, 2003).

Research methods that enable researchers to build trust over time with participants should be considered when asking about unpleasant emotional experiences (deMarrais & Tisdale, 2002). For example, longitudinal studies that employ interviews can help build trust between participants and researchers and support participants' openness about their unpleasant emotional experiences. In a longitudinal qualitative study of teachers' emotional experiences during a series of professional developments, Gaines, Osman, Freeman, Warner, Maddocks, and Schallert (2017) found that many teachers in interviews initially chose to emphasize pleasant experiences from professional development. These participants only reported unpleasant experiences after a degree of trust was built between interviewer and participant, and only after participants were explicitly prompted. In addition, studies using multiple data gathering methods may enable researchers to capture more reliably teachers' unpleasant emotional experiences (Schutz et al., 2016). Multiple methods enable researchers to triangulate teachers' self-reported emotional experiences, providing richer descriptions of the emotional phenomena. In this study, methods for triangulation may have included observations of educators during the professional development experiences, follow-up interviews with participants, and interviews with professional development providers. These research methods may have enabled me to triangulate educators' self-reports and more fully describe participants' unpleasant affective experiences during professional development.

The majority of the findings in this study were collected from cross-sectional data gathered at one time point, immediately following a professional development experience. Although cross-sectional data help researchers and practitioners better

describe teachers' motivational and emotional experience in and following a professional development and are worthy of study, the causal nature of the relationships is unknown. Further longitudinal research that examines the antecedents of motivation and emotions during professional development is warranted. In addition, participants were naturally nested in 64 different trainings and I did not randomly assign participants. Instead, many participants self-assigned themselves to trainings, and others were purposefully assigned to trainings by supervisors, as is typical for educators in summer trainings. The observation of educators in natural settings supports the ecological validity of the findings. However, the lack of random assignment to trainings may confound findings related to the nested nature of these data. For example, teachers may self-select into trainings that are valuable to them, thus reducing the degree of variance in value due to the training context. Therefore, the interpretation of ICCs should be treated with some caution.

These data were collected by surveys, administered immediately following a professional development experience. Teachers commonly complete evaluation surveys such as these. However, individuals are liable to error and implicitly or explicitly adopt a bias in their responses to evaluation questions such as these (Rijdt et al., 2013; Sanna et al., 2011). As participants evaluate their experience and plan for the future, Sanna et al. posited that participants are subject to a series of temporal biases. Temporal biases are especially relevant to self-reported questionnaires, such as the questionnaire presented in this study, where participants are expected to reflect on the past and estimate future impacts. Specifically, three temporal biases may have influenced participants in this

study: hindsight bias, implicit bias, and planning fallacy. As participants completed this survey after they completed the professional development, they may have held *hindsight biases*, believing they “knew it all along,” thus overestimating their prior knowledge.

In addition, they may have held *implicit biases*. As defined by Gilbert (2006), *implicit biases in evaluation* refer to the tendency of individuals to overestimate the pleasant and positive effects of future events. Participants in this study may have enjoyed their professional development experience and therefore overestimated the positive effects that implementation might have. Rijdt et al. (2013) discovered a similar positivity bias in their meta-synthesis on adults’ transfer of learning following trainings. Implicit biases such as these may explain, in part, the low correlation between participants’ intentions to implement immediately following the professional development in the summer and self-reported actual implementation in the fall semester ($r = 0.26$).

Participants’ *planning fallacy* is related to their implicit bias in that in the moments immediately following the professional development might underestimate the costs related to implementing. Educators can be overly optimistic in the summers, underestimating the time and efforts necessary to complete an activity (Sanna et al., 2011). Of course, teachers on summer break are not the only individuals susceptible to planning fallacies – there is anecdotal evidence that many graduate students often have similar experiences. These temporal biases might explain some of the skewness in educators’ responses, with most participants reporting being motivated and intending to implement. It is important, therefore, to continue to research teachers’ motivational emotional experiences during professional development using methods proximal to the

experience as with experience sampling. In addition, continued longitudinal research can support researchers in understanding which motivational characteristics during a professional development are especially vulnerable to temporal biases. Explicit research on teachers' temporal biases might also have implications for those interested in teachers' actual implementation following professional development experiences.

Finally, the number of participants who completed the follow-up survey in the fall semester was smaller than I had anticipated. The small sample size, only 63, of participants contributed to underpowered estimates. A larger sample might have provided more precise estimates of these relationships. More longitudinal research with larger sample sizes of educators is warranted.

IMPLICATIONS FOR RESEARCHERS

This study provides further evidence that emotions and motivation are fundamentally intertwined in learning situations, and it extends research on student emotions and motivation to teachers' experiences during professional development trainings. Many unanswered questions remain, and it is necessary to continuing to grow the research base surrounding motivation, emotion, and professional development (Saunders, 2013). I would like to discuss the implications that this study has for two groups of researchers whose interests overlap at times, motivation researchers and researchers of educators' professional development.

Continued research on the relationships between cost and value and expectancy is warranted. Although the measurement of cost in this study indicated that it remained a

distinct concept for educators, it did not contribute significantly to participants' intentions to implement. Experimental studies manipulating participants' perceptions of cost may help researchers elucidate the role of cost in the development of expectancies for success and values.

There are few studies exploring educators' motivational and emotional experiences over a large number of professional development experiences. Researchers should continue to explore the lack of variance in teachers' experiences across professional development experiences. Until more research such as this is done, it is not clear if this phenomenon is unique to the sample of educators in this study and therefore not representative of the population.

Although this study further establishes a relationship between teachers' pleasant emotions and motivation in professional development, it is important for researchers to continue considering the antecedents of educators' emotions in professional development. Qualitative and mixed-methods approaches may be especially useful in elucidating this question. These approaches may also help overcome some of the limitations I identified for this study such as reporting bias and lack of trust of researcher to report negative emotional experiences.

Longitudinal studies may also enable researchers to understand better how teachers' emotional experiences interact with their professional development experiences over time. As Fredrickson (2001) has theorized, emotional experiences may have cumulative or "building" effects on learning. Opfer and Pedder (2011) and others have posited that professional growth and implementation are cyclical, uneven, and non-linear

processes. Therefore, longitudinal studies with many data-collection points over time may expose changes in relationships between emotions, motivation, and implementation over time. In addition, studies such as these, collecting many data points from individuals may reveal intra-individual relationships in these variables (see for example, Frenzel, Becker-Kurz, Pekrun, & Goetz, 2015).

Finally, Gallo (2016) and other qualitative researchers have suggested that educators in professional development can be categorized by motivational and emotional profiles (Saunders, 2013). More quantitative research with educators can be done to explore if the emotional and motivational profiles identified in qualitative research exist across large samples of educators.

IMPLICATIONS FOR PRACTICE

Teachers' professional development experiences are highly personal endeavors. Although trainers (i.e., those delivering professional development) can create pleasant and motivational contexts it is important to acknowledge that teachers will experience these context in varied ways. Trainers must, therefore, provide space for teacher voice and input in professional development.

During a professional development experience, teacher voice can be incorporated by ensuring that professional development communication is not unidirectional: from the trainer to the teachers. This can be done by systematically and consistently providing time for teachers to discuss (with trainers and with colleagues) ideas and implementation strategies. This also can be done by trainers systematically "checking-in" with educators

throughout a professional development to ensure that participants expect success when implementing and that they find value for implementing, then adjusting instruction based on that feedback.

Prior to a professional development experience, teacher voice can be incorporated by ensuring that teachers play key roles in the planning and implementation of professional development. Often, school leaders determine the content that teachers “need” to know and the delivery mechanisms by which this content is presented. This common model rarely acknowledges the diverse ways in which teachers will interact with professional development. Taking teacher voice and input into account when planning can assist in aligning teachers’ individual professional development needs with the experiences afforded them.

It is also important to recognize that *all* professional development experiences are emotional experiences – especially high quality experiences (Cameron et al., 2013; Schmidt & Datnow, 2005). Those who organize professional development might do more to recognize the importance of emotions during professional development. Teachers’ pleasant affective experiences can also be supported in professional development contexts. Teachers who value trainings are likely to have pleasant affective experiences in these trainings. Teachers should, therefore, attend trainings that they believe they will value implementing and not attend trainings for which they have no value. In addition, trainings should be conducted in ways that support participants’ pleasant affective experiences rather than concentrating on avoiding unpleasant emotional experiences. For example, trainers can create pleasant relationships with participants and foster a positive

climate and culture in the training. One way to do this is for trainers to acknowledge the negative emotional experiences that teachers may encounter during a training and provide space for teachers to discuss these emotional reactions rather than attempting to suppress these negative emotional experiences (Saunders, 2013). Whitaker, Whitaker, and Lumpa (2008) recommended simple activities to support pleasant affect such as playing music as participants arrive, providing food, and even playing games during trainings. There is little empirical evidence, however, on which particular activities support most teachers' pleasant affect during professional development.

Teachers' emotional experiences and motivation play important roles as teachers consider implementing what they learned in a professional development. Practitioners should continue to consider the diversity of teachers' affective experiences when planning, implementing, and following up professional development experiences. Consideration of these affective experiences may enable practitioners to develop professional development experiences that are more meaningful for teachers and more positively influence teachers' classroom practices.

CONCLUSION

This study contributes to a growing body of research exploring teachers' emotional and affective experiences during professional development. Because professional development is considered the cornerstone of school improvement efforts, research such as this is warranted. Educators' emotional experiences during professional development and their motivation to implement are highly personal experiences that are

associated with educators' intentions to implement. Of these experiences, educators' pleasant affect and expectancy for success when implementing are most closely associated with intentions to implement. More research on these topics is warranted, however, practitioners should plan professional development trainings that promote educators' pleasant affective experiences and that enable educators to expect successful implementation when they return to their classrooms.

Appendices

Appendix A: Professional development experiences

Training title	<i>n</i>	Grade level ^a	District	Facilitator
Word Study - Six Syllable Types	10	E	AISD	MCPER
Word Study - Six Syllable Types	12	E	AISD	MCPER
Word Study - Six Syllable Types	17	E	AISD	MCPER
Six Syllable Types and Morphology	6	S	BISD	MCPER
Making Inferences and Predictions	7	S	BISD	MCPER
Effective Workstations	16	E	BISD	District
Response to Intervention (RTI)	14	E	BISD	MCPER
Vocabulary and Oral Development	18	E	BISD	MCPER
Features of Effective Instruction	38	E	BISD	District
Pre-K Read Aloud Routine	18	E	BISD	District
English Language Learners	10	E	MISD	MCPER
Six Syllable Types	11	E	MISD	District
Six Syllable Types	8	E	MISD	District
Vocabulary and Oral Development	10	E	MISD	District
Writing Mini-Lessons	12	E	MISD	District
Vocabulary and Oral Development	12	E	MISD	District
Determining Importance and Summarizing	8	E	MISD	MCPER
Literacy Centers	12	E	MISD	District
Classroom Management	10	S	MISD	District
Vocabulary	7	S	MISD	District
Making Inferences and Predictions	4	S	MISD	MCPER
English Language Learners	7	E	MISD	MCPER
Making Inferences and Predictions	17	E	MISD	MCPER
Phonological Awareness	10	E	MISD	District
Vocabulary and Oral Development	14	E	MISD	District
Writing Mini-Lessons	11	E	MISD	District
Vocabulary and Oral Development	10	E	MISD	District
Literacy Centers	15	E	MISD	District
Mentor Texts in Social Studies	4	S	MISD	District
Determining Importance and Summarizing	6	S	MISD	MCPER

Training title	<i>n</i>	Grade level ^a	District	Facilitator
Making Inferences and Predictions	7	S	MISD	MCPER
Vocabulary and Oral Development	13	E	MISD	District
Read Aloud Routine	7	E	MISD	District
Vocabulary and Oral Development	8	E	MISD	District
Workstations	12	E	MISD	District
Making Inferences and Predictions	2	E	MISD	MCPER
Determining Importance and Summarizing	9	E	MISD	MCPER
Writing PreK AM D2	14	E	MISD	District
Classroom Management	14	E	MISD	District
English Language Learners	11	S	MISD	District
Morphology	9	S	MISD	MCPER
Vocabulary and Oral Development	14	E	MISD	District
Read Aloud Routine	8	E	MISD	District
Workstations	19	E	MISD	District
Determining Importance and Summarizing	5	E	MISD	MCPER
Reading and Writing	13	E	MISD	District
Literature and Math	19	E	MISD	District
English Language Learners	3	S	MISD	MCPER
Vocabulary and Oral Development	7	S	MISD	District
Mentor Text in Writing	7	S	MISD	District
Writing	5	S	TISD	MCPER
Read Aloud Routine	11	E	McISD	MCPER
Fluency	11	E	McISD	MCPER
Six Syllable Types	11	E	McISD	MCPER
Phonological Awareness	11	E	McISD	MCPER
Effective Reading Instruction	19	E	McISD	MCPER
Making Inferences and Predictions	8	S	McISD	MCPER
Making Inferences and Predictions	5	S	McISD	MCPER
Determining importance and Summarizing	8	S	McISD	MCPER
Determining Importance and Summarizing	8	S	McISD	MCPER
Making Inferences and Predictions	7	S	McISD	MCPER
Making Inferences and Predictions	4	S	McISD	MCPER
Determining Importance and Summarizing	6	E	McISD	MCPER
Determining Importance and Summarizing	4	E	McISD	MCPER

Note. E = elementary teachers; S = secondary teachers; district names are pseudonyms; AISD = Alpha Independent School District; B = Beta Independent School District; MISD = Mango Independent School District; McISD = McAlpha Independent School District; TISD = Tango Independent School District; MCPER = The Meadows Center for Preventing Educational Risk; District = district employee facilitated the professional development experience.

Appendix B: Participant consent form and questionnaire

TEACHERS' EXPERIENCES DURING PROFESSIONAL DEVELOPMENT

TEACHER CONSENT INFORMATION

Educators' emotions during professional development and times of change

Conducted by: David J. Osman, MA, MEd, of The University of Texas at Austin: *Department of Educational Psychology; Human Development, Culture, and Learning Sciences*; Telephone: 512-232-4175

Faculty Sponsor: Diane L. Schallert, PhD, *Department of Educational Psychology; Human Development, Culture, and Learning Sciences*; Telephone: 512-471-0784

You are being asked to participate in a research study. This form provides you with information about the study. The person in charge of this research will also describe this study to you and answer all of your questions. Please read the information below and contact the researcher if you have any questions you have before deciding whether or not to take part. Your participation is entirely voluntary. You can refuse to participate without penalty or loss of benefits to which you are otherwise entitled. You can stop your participation at any time and your refusal will not impact current or future relationships with UT Austin or your school. To do so, simply stop participation. You may print a copy of this webpage for your records.

The purpose of this study is to explore teachers' positive emotions during times of change.

If you agree to be in this study, we will ask you to do the following things:

- complete a short survey, and
- provide demographic data.

Total estimated time to participate in study is approximately 20 minutes for the short survey.

Risks of being in the study

- There are no known risks associated with this project.

Benefits of being in the study are that you will be contributing to scientific knowledge about teacher emotion during times of change. What we learn from this study could improve professional development for teachers across the nation.

Compensation:

- There is no charge or compensation for participation in this study.

Confidentiality and Privacy Protections:

- Any information obtained about you from this study will be kept strictly confidential. All research records will be stored in a locked cabinet, kept in the office of David Osman at University of Texas at Austin, and accessed only by project staff for the duration of this study. Members of the Institutional Review Board have the legal right to review your research records and will protect the confidentiality of those records to the extent permitted by law.
- The information obtained in this program may be published in professional journals or presented at professional conferences, but no identifying information linking you to the study will be included.
- The data resulting from your participation may be made available to other researchers in the future for research purposes not detailed within this consent form. In these cases, the data will contain no identifying information that could associate you with it, or with your participation in any study.

Contacts and Questions:

If you have any questions about the study, please contact the researcher. If you have questions later, want additional information, or wish to withdraw your participation call the researchers conducting the study. Their names, phone numbers, and e-mail addresses are at the top of this page.

This study has been reviewed and approved by The University Institutional Review Board and the study number is 2014-03-0123. For questions about your rights or any dissatisfaction with any part of this study, you can contact, anonymously if you wish, the Institutional Review Board by phone at (512) 471-8871 or email at orsc@uts.cc.utexas.edu.

Statement of Consent:

I have read the above information and have sufficient information to make a decision about participating in this study. I consent to participate in the study.

Name: _____

Signature: _____

Email address: _____

Date: _____

Name of training: _____

Directions: Please indicate your opinion about each of the questions below by circling any one of the seven responses, ranging from (1) “*strongly disagree*,” to (7) “*strongly agree*.”

Please respond to each of the questions by considering the combination of your current ability, resources, and opportunity to do each of the following in your present position.

	Strongly disagree	Disagree	Some what disagree	Neither agree nor disagree	Some what agree	Agree	Strongly agree
I am confident I can do what was asked of me in this professional development.	1	2	3	4	5	6	7
I believe I can be successful applying this training.	1	2	3	4	5	6	7
I know that I can effectively put into practice the things presented in this training.	1	2	3	4	5	6	7
I am excited to put this training into practice.	1	2	3	4	5	6	7
Participating in this training will help me in my job.	1	2	3	4	5	6	7
It is important to me to apply what I learned in this professional development.	1	2	3	4	5	6	7
I have to give up too much to put this training into practice.	1	2	3	4	5	6	7
Applying this professional development will require too much effort.	1	2	3	4	5	6	7
Applying this training will be too stressful.	1	2	3	4	5	6	7

Directions: Please indicate your level of knowledge **NOW** for each topic that was presented at the professional development today by circling any one of the four responses in the columns on the left side, ranging from (1) “poor,” to (4) “excellent.”

THEN, indicate your level of knowledge **BEFORE** the professional development today for each topic that was presented by circling any one of the four responses in the columns on the right side, ranging from (1) “poor,” to (4) “excellent.”

	NOW				BEFORE the professional development			
	Poor	Fair	Good	Excellent	Poor	Fair	Good	Excellent
Rate your knowledge of the content presented in the training.	1	2	3	4	1	2	3	4
Rate your knowledge of ways to teach the content presented in the training.	1	2	3	4	1	2	3	4
Rate your knowledge of the teaching strategies presented in the training.	1	2	3	4	1	2	3	4
Rate your knowledge of ways to teach the strategies presented in the training.	1	2	3	4	1	2	3	4
Rate your knowledge of the key aspects of the professional development	1	2	3	4	1	2	3	4

Directions: This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word.

Indicate to what extent you have felt this way during training you just attended.

	Never	Sometimes	About half the time	Most of the time	Always				
interested	1	2	3	4	5	6	7	8	9
distressed	1	2	3	4	5	6	7	8	9
excited	1	2	3	4	5	6	7	8	9
upset	1	2	3	4	5	6	7	8	9
strong	1	2	3	4	5	6	7	8	9
guilty	1	2	3	4	5	6	7	8	9
scared	1	2	3	4	5	6	7	8	9
hostile	1	2	3	4	5	6	7	8	9
enthusiastic	1	2	3	4	5	6	7	8	9
proud	1	2	3	4	5	6	7	8	9
irritable	1	2	3	4	5	6	7	8	9
alert	1	2	3	4	5	6	7	8	9
ashamed	1	2	3	4	5	6	7	8	9
inspired	1	2	3	4	5	6	7	8	9
nervous	1	2	3	4	5	6	7	8	9
determined	1	2	3	4	5	6	7	8	9
attentive	1	2	3	4	5	6	7	8	9
jittery	1	2	3	4	5	6	7	8	9
active	1	2	3	4	5	6	7	8	9
afraid	1	2	3	4	5	6	7	8	9

Directions: Please indicate your opinion about each of the questions below by marking any responses, ranging from (1) “*definitely not*,” to (9) “*definitely will*.”

Please respond to each of the questions by considering the combination of your current ability, resources, and opportunity to do each of the following in your present position.

	Definitely will not		Probably will not		Might or might not		Probably will		Definitely will	
To what degree to you plan to implement the content presented in the training?	1	2	3	4	5	6	7	8	9	
To what degree to you plan to implement the teaching strategies presented in the training?	1	2	3	4	5	6	7	8	9	
To what degree to you plan to implement the activities presented in the professional development?	1	2	3	4	5	6	7	8	9	

Directions: Please indicate your opinion about each of the questions below by marking any one of the five responses, ranging from (1) “*not at all*,” to (5) “*a great deal*.”

Please respond to each of the questions by considering the combination of your current ability, resources, and opportunity to do each of the following in your present position.

	Not at all		Very little		Some influence		Quite a bit		A great deal	
	1	2	3	4	5	6	7	8	9	
To what extent can you use a variety of assessment strategies?	1	2	3	4	5	6	7	8	9	
To what extent can you provide an alternative explanation or example when students are confused?	1	2	3	4	5	6	7	8	9	
To what extent can you craft good questions for your students?	1	2	3	4	5	6	7	8	9	
How well can you implement alternative strategies in your classroom?	1	2	3	4	5	6	7	8	9	
How much can you do to control disruptive behavior in the classroom?	1	2	3	4	5	6	7	8	9	
How much can you do to get children to follow classroom rules?	1	2	3	4	5	6	7	8	9	
How much can you do to calm a student who is disruptive or noisy?	1	2	3	4	5	6	7	8	9	

	Not at all		Very little		Some influence		Quite a bit		A great deal
How well can you establish a classroom management system with each group of students?	1	2	3	4	5	6	7	8	9
How much can you do to get students to believe they can do well in schoolwork?	1	2	3	4	5	6	7	8	9
How much can you do to help your students value learning?	1	2	3	4	5	6	7	8	9
How much can you do to motivate students who show low interest in schoolwork?	1	2	3	4	5	6	7	8	9
How much can you assist families in helping their children do well in school?	1	2	3	4	5	6	7	8	9

1. What level students do you work directly with? *Please circle as many as apply*

Early Childhood (0-3 yrs.)

3rd grade

8th grade

Pre-Kindergarten

4th grade

9th grade

Kindergarten

5th grade

10th grade

1st grade

6th grade

11th grade

2nd grade

7th grade

12th grade

2. What is your role on your campus? *Please circle one response*

teacher

instructional coach

principal/administrator

other: _____

3. What is your school email address? We would like to follow-up with you in the fall.

4. How many years have you taught/been in education? *Pre-service teachers please write 0.*

5. What is your gender?

6. What is your age?

7. Are you a certified teacher in Texas? *Please circle one response*

Yes

No

8. What kind of teacher preparation program did you attend? *Please circle one response*

Traditional university/college training

Alternative certification training

Other: _____

9. What is the highest degree you have attained? *Please circle one response*

High school degree

Bachelor's degree

Master's degree (MEd, MA)

Terminal degree (PhD, EdD, JD)

Other: _____

10. How many students did you work with this past school year? *The number of students in all of your classes, for example.*

11. What subject matter do you teach? *Select as many as apply*

English/Language arts

Social studies/history

Math

Science

Music/Art/Theater

Languages other than English/foreign languages

Appendix C: Selected *Mplus* code for multilevel CFA

```
TITLE: Multilevel CFA with invariant loadings;

ANALYSIS:
  TYPE = twolevel;
  Estimator is MLR;

MODEL:
  %between%
  DEXP by EVC_E1
    EVC_E2(1)
    EVC_E3(2);
  DVAL by EVC_V1
    EVC_V2(3)
    EVC_V3(4);
  DCOSTR by EVC_C1R
    EVC_C2R(5)
    EVC_C3R(6);
  EVC_E1@0 EVC_V1@0 EVC_C1R@0;
  %within%
  EXP by EVC_E1
    EVC_E2(1)
    EVC_E3(2);
  VAL by EVC_V1
    EVC_V2(3)
    EVC_V3(4);
  COSTR by EVC_C1R
    EVC_C2R(5)
    EVC_C3R(6);

OUTPUT: sampstat standardized tech1 modindices (3.84);
```

Appendix D: Selected *Mplus* code for hierarchical linear models

```
TITLE: RQ1 Motivation & Implementation NO INTERACTION;
```

```
DEFINE: Center EXP VAL COST_R DEG_MA (GROUP);
```

```
ANALYSIS:
```

```
    TYPE = twolevel;
```

```
    ESTIMATOR = MLR;
```

```
MODEL:
```

```
    %between%
```

```
    INTENT;
```

```
    %within%
```

```
    INTENT ON EXP VAL COST_R DEG_MA;
```

```
OUTPUT: sampstat stdyx CINTERVAL;
```

```
PLOT: TYPE IS PLOT3;
```

```
TITLE: RQ2 Motivation Affect & Implementation INTERACTION;
```

```
DEFINE: Center EXP VAL COST_R PLEASE UNPLEASE DEG_MA  
(GROUP);
```

```
ANALYSIS:
```

```
    TYPE = twolevel;
```

```
    ESTIMATOR = MLR;
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```
MODEL:
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```
    %between%
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```
    INTENT;
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    %within%
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```
    INTENT on EXP VAL COST_R PLEASE  
    UNPLEASE MOTxPLE MOTxUNP DEG_MA;
```

```
OUTPUT: sampstat stdyx CINTERVAL;
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```
PLOT: TYPE IS PLOT3;
```

```
TITLE: RQ3 Motivation and Cognitive Factors;

DEFINE: Center RACE_HIS KNOW_BEF KNOWDIFF TSES (GROUP);

ANALYSIS:
    TYPE = twolevel;
    ESTIMATOR = MLR;

MODEL:
    %between%
    MOT;

    %within%
    MOT on RACE_HIS KNOW_BEF KNOWDIFF TSES;

OUTPUT: sampstat stdyx CINTERVAL;

PLOT: TYPE IS PLOT3;
```

References

- Abdal-Haqq, I. (1995). *Making time for teacher professional development (Digest 95-4)*. Washington, D.C.: ERIC Clearinghouse on Teaching and Teacher Education.
- Abrami, P. C., Poulsen, C., & Chambers, B. (2004). Teacher motivation to implement an educational innovation: Factors differentiating users and non-users of cooperative learning. *Educational Psychology: An International Journal of Experimental Educational Psychology*, 24(2), 201-216. doi: 10.1080/0144341032000160146
- Ackerman, R., & Maslin-Ostrowski, P. (2004). The wounded leader and emotional learning in the schoolhouse. *School Leadership and Management*, 24, 311–328. doi: 10.1080/1363243042000266945
- Addy, T. M., Blanchard, M. R. (2010). The problem with reform from the bottom up: Instructional practices and teacher beliefs of graduate teaching assistants following a reform-minded university teacher certificate programme. *International Journal of Science Education*, 32(8), 1045-1071.
- Ado, K. (2013). Action research: Professional development to help support and retain early career teachers. *Educational Action Research*, 21(2), 131-146. doi: 10.1080/09650792.2013.789701
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Ajzen, I. (2011). Behavioral interventions: Design and evaluation guided by the theory of planned behavior. In M. M. Mark, S. I. Donaldson, and B. Campbell (Eds.), *Social psychology and evaluation* (pp. 74-100). New York, NY: Guilford.
- Aloe, A. M., Amo, L. C., & Shanahan, M. E. (2014). Classroom management self-efficacy and burnout: A multivariate meta-analysis. *Educational Psychology Review*, 26(1), 101-126. doi: 10.1007/s10648-013-9244-0
- Andersen, L., & Ward, T. J. (2014). Expectancy-value models for the STEM persistence plans of ninth-grade, high-ability students: A comparison between Black, Hispanic, and White students. *Science Education*, 98(2), 216-242. doi: 10.1002/sce.21092

- Archambault, L. M., & Barnett, J. H. (2010). Revisiting technological pedagogical content knowledge: Exploring the TPACK framework. *Computers and Education*, 55(4), 1656-1662. doi: 10.1016/j.compedu.2010.07.009
- Arens, S. A., Stoker, G., Barker, J., Shebby, S., Wang, X., Cicchinelli, L. F., & Williams, M. J. (2012). *Effects of curriculum and teacher professional development on the language proficiency of elementary English language learner students in the central region* (NCEE 2012-4013). Denver, CO: Mid-Continent Research for Education and Learning.
- Arnold, M. B. (1960). *Emotion and personality*. New York: Columbia University Press.
- Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review*, 64, 359-372. doi: 10.1037/h0043445
- Aultman, L. P., Williams-Johnson, M. R., & Schutz, P. A. (2009). Boundary dilemmas in teacher-student relationships: Struggling with “the line.” *Teaching and Teacher Education*, 25(5), 636-646. doi: 10.1016/j.tate.2008.10.002
- Avalos, B. (2011). Teacher professional development in *Teaching and Teacher Education*. *Teaching and Teacher Education*, 27, 10-20. doi: 10.1016/j.tate.2010.08.007
- Ball, D., & Cohen, D. (1999). Toward a practice-based theory of professional education. In L. Darling-Hammond & G. Sykes (Eds.), *Teaching as the Learning Profession* (pp. 3-32). San Francisco, CA: Jossey Bass.
- Barrett, L. F., & Barrett, D. J. (2001). An introduction to computerized experience sampling in psychology. *Social Science Computer Review*, 19, 175-185.
- Barrett, L., & Russell, J. A. (1998). Independence and bipolarity in the structure of current affect. *Journal of Personality and Social Psychology*, 74(4), 967-984.
- Barron, K. E., & Hulleman, C. S. (2015). The expectancy-value-cost model of motivation. In J.D. Wright (Ed.), *International Encyclopedia of Social and Behavioral Sciences* (2nd edition, pp. 503-509). Oxford: Elsevier Ltd. doi:10.1016/B978-0-08-097086-8.26099-6

- Battle, A., & Wigfield, A. (2003). College women's value orientations toward family, career, and graduate school. *Journal of Vocational Behavior*, 62(1), 56-75. doi: 10.1016/S0001-8791(02)00037-4
- Becker, E. S., Goetz, T., Morger, V., & Ranellucci, J. (2014). The importance of teachers' emotions and instructional behavior for their students' emotions: An experience sampling analysis. *Teaching and Teacher Education*, 26. doi:10.1016/j.tate.2014.05.002
- Bell, B., & Gilbert, J. (1994). Teacher professional development as professional, personal, and social development. *Teaching and Teacher Education*, 10(5), 483-497. doi: 10.1016/0742-051X(94)90002-7
- Bereiter, C. & Scardamalia, M. (1993). *Surpassing ourselves: An inquiry into the nature and implications of expertise*. Chicago, IL: Open Court.
- Beyer, J., & Niño, D. (2001). Culture as a source, expression, and reinforce of emotions in organizations. In R. L. Payne & C. L. Cooper (Eds.), *Emotions at Work: Theory, Research and Applications for Management* (pp. 173-198). New York, NY: John Wiley & Sons.
- Bhanji, F., Gottesman, R., de Grave, W., Steinert, Y., & Winer, L. R. (2012). The retrospective pre-post: A practical method to evaluate learning from an educational program. *Academic Emergency Medicine*, 19(2), 189-194. doi: 10.1111/j.1553-2712.2011.01270.x
- Birman, B., Le Floch, K. C., Klekotka, A., Ludwig, M., Taylor, J., Walters, K., et al. (2007). *State and Local Implementation of the No Child Left Behind Act: Vol. 2. Teacher Quality under NCLB: Interim Report*. Washington, DC: U.S. Department of Education; Office of Planning, Evaluation and Policy Development; Policy and Program Studies Service.
- Borko, H. (2004). Professional development and teacher learning: Mapping the terrain. *Educational Researcher*, 33(8), 3-15.
- Bos, J. M., Sanchez, R. C., Tseng, F., Rayyes, N., Ortiz, L., & Sinicrope, C. (2012). *Evaluation of Quality Teaching for English Learners (QTEL) professional development* (NCEE 2012-4005). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

- Boyd, J., & Boyd, S. (2005). Reflect and improve: Instructional development through a teaching journal. *College Teaching*, 53(3), 110-114.
- Brackett, M. A., & Rivers, S. E. (2014). Transforming students' lives with social and emotional learning. In R. Pekrun and L. Linnenbrink-Garcia (Eds.), *International Handbook of Emotions in Education* (pp. 368-388). New York, NY: Routledge.
- Brophy, J. E., & Good, T. L. (1986). Teacher behavior and student achievement. In M. C. Wittrock (Ed.), *Handbook of Research on Teaching* (3rd ed., pp. 328-375). New York: Macmillan.
- Brown, E. R., Smith, J. L., Thoman, D. B., Allen, J. M., & Muragishi, G. (2015). From bench to bedside: A communal utility value intervention to enhance students' biomedical science motivation. *Journal of Educational Psychology*, 107(4), 1116-1135. doi: 10.1037/edu0000033
- Busemeyer, J. R., & Jones, L. E. (1983). Analysis of multiplicative combination rules when the causal variables are measured with error. *Quantitative Methods in Psychology*, 93(3), 549-562.
- Butler, R. (2007). Teachers' achievement goal orientations and associations with teachers' help seeking: Examination of a novel approach to teacher motivation. *Journal of Educational Psychology*, 99(2), 241-252. doi: 10.1037/0022-0663.99.2.241
- Butler, R., & Shibaz, L. (2008). Achievement goals for teaching as predictors of students' perceptions of instructional practices and students' help seeking and cheating. *Learning and Instruction*, 18(5), 453-467. doi: 10.1016/j.learninstruc.2008.06.004
- Byrne, B. M. (2013). *Structural Equation Modeling with Mplus: Basic Concepts, Applications, and Programming*. London: Taylor and Francis.
- Calderhead, J. (1996). Teachers: Beliefs and knowledge. In D. Berliner and R. Calfee (Eds.), *Handbook of educational psychology*. New York, NY: Macmillan.
- Cameron, S., Hulholland, J., & Branson, C. (2013). Professional learning in the lives of teachers: Towards a new framework for conceptualizing teacher learning. *Asia-Pacific Journal of Teacher Education*, 41(4), 377-397. doi: 10.1080/1359866X.2013.838620

- Catalino, L. I., & Fredrickson, B. L. (2011). A Tuesday in the life of a flourisher: The role of positive emotional reactivity in optimal mental health. *Emotion, 11*(4), 938–950.
- Chang, M.-L. (2009). An appraisal perspective of teacher burnout: Examining the emotional work of teachers. *Educational Psychology Review, 21*, 193-218. doi: 10.1007/s10648-009-9106-y
- Chitpin, S. (2011). Can mentoring and reflection cause change in teaching practice? A professional development journey of a Canadian teacher educator. *Professional Development in Education, 47*(2), 225-240.
- Christesen, E., & Turner, J. (2014). Identifying teachers attending professional development by their stages of concern: Exploring attitudes and emotions. *The Teacher Educator, 49*(4), 232-246. doi: 10.1080/08878730.2014.933641
- City, E. A. (2011). Learning from instructional rounds. *Educational leadership, 69*(2), 36-41.
- Coburn, C. E., & Woulfin, S. L. (2012). Reading coaches and the relationship between policy and practice. *Reading Research Quarterly, 47*(1), 5-30. doi:10.1002/RRQ.008
- Cole, J. S., Bergin, D. A., & Whittaker, T. A. (2008). Predicting student achievement for low tests with effort and task value. *Contemporary Educational Psychology, 33*(4), 609-624. doi: 10.1016/j.cedpsych.2007.10.002
- Conley, A. M. (2012). Patterns of motivation beliefs: Combining achievement goal and expectancy-value perspectives. *Journal of Educational Psychology, 104*(4), 32-47. doi: 10.1037/a0026042
- Cross, D. I., & Hong, J. Y. (2009). Beliefs and professional identity: Critical constructs in examining the impact of reform on the emotional experiences of teachers. In P. A. Schutz & M. Zembylas (Eds.), *Advances in teacher emotion research*. New York, NY: Springer.
- Cross, D. I., & Hong, J. Y. (2012). An ecological examination of teachers' emotions in the school context. *Teaching and Teacher Education, 28*(7), 957-967. doi:10.1016/j.tate.2012.05.001

- Crawford, J. R., & Henry, J. D. (2004). The Positive and Negative Affect Schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology, 43*, 245-265.
- Cuthell, J. (2002). MirandaNet: A learning community—a community of learners. *Journal of Interactive Learning Research, 13*(1-2), 167-186.
- Darby, A. (2008). Teachers' emotions in the reconstruction of professional self-understanding. *Teaching and Teacher Education, 24*, 1160-1172.
- Day, C., & Leitch, R. (2001). Teachers' and teacher educators' lives: The role of emotion. *Teaching and Teacher Education, 17*, 403-415.
- de Jesus, S. N., & Lens, W. (2005). An integrated model for the study of teacher motivation. *Applied Psychology, 54*(1), 119-134. doi: 10.1111/j.1464-0597.2005.00199.x
- deMarrais, K., & Tisdale, K. (2002). What happens when researchers inquire into difficult emotions?: Reflections on studying women's anger through qualitative interviews. *Educational Psychologist, 37*(2), 115-123. doi: 10.1207/S15326985EP3702_6
- Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher, 38*(3), 181-199. doi:10.3102/0013189X08331140
- Desimone, L. M. (2011). A primer on effective professional development. *Phi Delta Kappan, 92*(6), 68-71. doi: 10.1177/0031721711109200616
- Diekman, A. B., Clark, E. K., Johnston, A. M., Brown, E. R., & Steinberg, M. (2011). Malleability in communal goals and beliefs influences attraction to STEM careers: evidence for a goal congruity perspective. *Journal of Personality and Social Psychology, 101*(5), 902-918. doi: 10.1037/a0025199
- Dimmock, C. (2014). Conceptualising the research-practice-professional development nexus: Mobilising schools as 'research-engaged' professional learning communities. *Professional Development in Education, 42*(1), 36-53. doi: 10.1080/19415257.2014.963884

- Donnell, L. A., & Gettinger, M. (2015). Elementary school teachers' acceptability of school reform: Contribution of belief congruence, self-efficacy, and professional development. *Teaching and Teacher Education*, *51*, 47-57. doi: 10.1016/j.tate.2015.06.003
- Dörnyei, Z., & Ushioda, E. (2011). *Teaching and researching motivation*. Harlow: Longman.
- Eccles J. S., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J. L., & Midgley, C. (1983). Expectancies, values, and academic behaviors. In J. T. Spence (Ed.), *Achievement and achievement motivation* (pp. 75–146). San Francisco, CA: W. H. Freeman.
- Eccles, J. S., & Wigfield, A. (1995). In the mind of the actor: The structure of adolescents' academic achievement related-beliefs and self-perceptions. *Personality and Social Psychology Bulletin*, *21*, 215-225.
- Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, *53*, 109-132. doi: 10.1146/annurev.psych.53.100901.135153
- Ekman, P. (2016). What scientists who study emotion agree about. *Perspectives on Psychological Science*, *11*(1), 31-34. doi: 10.1177/1745691615596992
- Ellsworth, J. B. (2000). *Surviving Change: A Survey of Educational Change Models*. New York, NY: ERIC Clearinghouse on Information and Technology.
- Emo, W. (2015). Teachers' motivations for initiating innovations. *Journal of Educational Change*, *16*, 171-195. doi: 10.1007/s10833-015-9243-7
- Eran, A. (2012). Perspective teachers' future time perspective and professional plans about teaching: The mediating role of academic optimism. *Teaching and Teacher Education*, *28*, 111-123. doi: 10.1016/j.tate.2011.09.006
- Evans, L. (2014). Leadership for professional development and learning: Enhancing our understanding of how teachers develop. *Cambridge Journal of Education*, *42*(2), 179-198. doi: 10.1080/0305764X.2013.860083

- Fedock, P., Zambo, R., & Cobern, W. (1996). The professional development of college science professors as science teacher educators. *Science Education*, 80(1), 5–19.
- Fiedler, K., & Beier, S. (2014). Affect and cognitive processes in educational contexts. In R. Pekrun and L. Linnenbrink-Garcia (Eds.), *International Handbook of Emotions in Education* (pp. 36-55). New York, NY: Routledge.
- Fives, H., & Buehl, M. M. (2009). Examining the factor structure of the teachers' sense of efficacy scale. *The Journal of Experimental Education*, 78(1), 118-134.
- Fives, H., & Buehl, M. M. (2012). Spring cleaning for the “messy” construct of teachers’ beliefs: What are they? Which have been examined? What can they tell us? In K. R. Harris, S. Graham & T. Urdan (Eds.), *APA Educational Psychology handbook: Vol. 2. Individual Differences and Cultural and Contextual Factors*, (pp. 471-499). doi: 10.1037/13274-019
- Flake, J. K., Barron, K. E., Hulleman, C., McCoach, B. D., & Welsh, M. E. (2015). Measuring cost: The forgotten component of expectancy-value theory. *Contemporary Educational Psychology*, 41, 232-244. doi: 10.1016/j.cedpsych.2015.03.002
- Foley, L. S. (2011). Exploring K-3 teachers’ implementation of comprehension strategy instruction (CSI) using expectancy-value theory. *Literacy Research and Instruction*, 50(3), 195-215. doi:10.1080/19388071.2010.505680
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology. The broaden-and-build theory of positive emotions. *American Psychologist*, 56(3), 218–226.
- Fredrickson, B. L. (2013). Positive emotions broaden and build. *Advances in Experimental Social Psychology*, 47, 1-53. doi: 10.1016/B978-0-12-407236-7.00001-2
- Fredrickson, B. L., & Branigan, C. (2005). Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition and Emotion*, 19(3), 313–332.
- Fredrickson, B. L., & Joiner, T. (2002). Positive emotions trigger upward spirals toward emotional well-being. *Journal of Personality and Social Psychology*, 65(1), 45–55.

- Fredrickson, B. L., Cohn, M. A., Coffey, K. A., Pek, J., & Finkel, S. M. (2008). Open hearts build lives: Positive emotions, induced through loving-kindness meditation, build consequential personal resources. *Journal of Personality and Social Psychology, 95*(5), 1045–1062.
- Fredrickson, B. L., Tugade, M. M., Waugh, C. E., & Larkin, G. R. (2003). What good are positive emotions in crises? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. *Journal of Personality and Social Psychology, 84*(2), 365–376.
- Frenzel, A. C. (2014). Teacher emotions. In R. Pekrun and L. Linnenbrink-Garcia (Eds.), *International Handbook of Emotions in Education* (pp. 494-520). New York, NY: Oxford.
- Frenzel, A. C., Becker-Kurz, B., Pekrun, R., & Goetz, T. (2015). Teaching this class drives me nuts! Examining the person and context specificity of teacher emotions. *PLoS ONE, 10*(6), 1-15. doi: 10.1371/journal.pone.0129630
- Frenzel, A. C., Pekrun, R., Goetz, T., Daniels, L. M., Durksen, T. I., Becker-Kurz, B., & Klassen, R. M. (2016). Measuring teachers' enjoyment, anger, and anxiety: The teacher emotions scale (TES). *Contemporary Educational Psychology, 46*, 148-163. doi: 10.1016/j.cedpsych.2016.05.003
- Frenzel, A. C., & Stephens, E. J. (2013). Emotions. In N. C. Hall & T. Goetz (Eds.), *Emotion, Motivation, and Self-regulation: A Handbook for Teachers* (pp. 1-56). Bingley, UK: Emerald.
- Frenzel, A. C., Goetz, T., Stephens, E. J., & Jacob, B. (2009). Antecedents and effects of teachers' emotional experiences: An integrated perspective and empirical test. In P. A. Schutz & M. Zembylas (Eds.), *Advances in Teacher Emotion Research: The Impact on Teachers' Lives* (pp. 129-152). New York, NY: Springer.
- Frijda, N. H. (2000). The psychologists' point of view. In M. Lewis and J. M. Haviland-Jones (Eds.), *Handbook of Emotions* (2nd edition, pp. 59-74). New York, NY: Guilford.
- Frijda, N. H. (2008). The psychologists' point of view. In M. Lewis, J. M. Haviland-Jones, and L. F. Barrett (Eds.), *Handbook of Emotions* (3rd edition, pp. 223-281). New York, NY: Guilford.

- Fullan, M. (2001). *The new meaning of educational change*. New York, NY: Teacher's College, Columbia University.
- Gallo, E. (2016). "I want to be happy as a teacher." How emotions impact teacher professional development. In D. Gabryś-Barker & D. Gałajda (Eds.), *Positive psychology perspectives on foreign language learning and teaching* (pp. 249-266). Switzerland, Springer.
- Garet, M. S., Cronen, S., Eaton, M., Kurki, A., Ludwig, M., Jones, W., . . . & Szejnberg, L. (2008). *The impact of two professional development interventions on early reading instruction and achievement* (NCEE 2008-4030). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.
- Garet, M. S., Wayne, A. J., Stancavage, F., Taylor, J., Eaton, M., Walters, K., . . . & Doolittle, F. (2011). *Middle School Mathematics Professional Development Impact Study: Findings after the second year of implementation* (NCEE 2011-4025). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.
- Gaines, R. E., Osman, D. J., Freeman, J. L., Warner, J. R., Maddocks, D. L. S., & Schallert, D. L. (2017, April). *Teachers' Emotional Experiences in Professional Development: Where They Come from and What They Can Mean*. Paper presented at the American Educational research Association 2017 Annual Meeting, San Antonio, TX.
- Gay Van Duzor, A. (2011). Capitalizing on teacher expertise: Motivations for contemplating transfer from professional development to the classroom. *Journal of Science Education Technology*, 20, 363-374. doi: 10.1007/s10956-010-9258-z
- Gegenfurtner, A. (2011). Motivation and transfer in professional training: A meta-analysis of the moderating effects of knowledge type, instruction, and assessment conditions. *Educational Research Review*, 6, 153-168. doi: 10.1016/j.edurev.2011.04.001
- Gilbert, D. T. (2006). *Stumbling upon happiness*. New York, NY: Knopf.
- Gniewosz, B., Eccles, J. S., & Noack, P. (2014). Early adolescents' development of academic self-concept and intrinsic task value: The role of contextual feedback. *Journal of Research on Adolescence*, 25(3), 459-473. doi: 10.1111/jora.12140

- Goetz, T., & Bieg, M. (2016). Academic emotions and their regulation via emotional intelligence. In A. A. Lipnevich, F. Preckel, & R. D. Roberts (Eds.), *Psychosocial Skills and School Systems in the 21st Century* (pp. 279-299). Switzerland: Springer International.
- Goldsmith, L., & Schifter, D. (2009). Understanding teachers in transition: Characteristics of a model for developing teachers. In E. Fennema and B. S. Nelson (Eds.), *Mathematics teachers in transition*. Mahwah, NJ: Lawrence Erlbaum.
- Gorozidis, G., & Papaioannou, A. G. (2014). Teachers' motivation to participate in training and to implement innovations. *Teaching and Teacher Education, 39*, 1-11. doi: 10.1016/j.tate.2013.12.001
- Gravani, M. N. (2012). Adult learning principles in designing learning activities for teacher development. *International Journal of Lifelong Education, 31*(4), 419-432. doi: 10.1080/02601370.2012.663804
- Greenleaf, C. L., Schoenbach, R., Cziko, C., & Mueller, F. L. (2001). Apprenticing adolescent readers to academic literacy. *Harvard Educational Review, 71*(1), 79-129.
- Grounauer, M.-M. (1993). Caution and years of experience (J. Neufeld, Trans.). In M. Huberman (Ed.), *The Lives of Teachers* (pp. 157-180). New York, NY: Teachers College Press.
- Grove, C. M. (2007). The importance of values-alignment within a role-hierarchy to foster teachers' motivation for implementing professional development. Unpublished Doctoral Dissertations, Florida State University, Tallahassee, FL.
- Guskey, T. R., & Passaro, P. D. (1994). Teacher efficacy: A study of construct dimensions. *American Educational Research Journal, 31*(3), 627-643.
- Hall, G. E., & Hord, S. M. (2006). *Implementing change: Patterns, principles and potholes*. New York, NY: Pearson Education.
- Hargreaves, A. (1997) Rethinking educational change: going deeper and wider in the quest for success. In A. Hargreaves (Ed.), *Rethinking Educational Change with Heart and Mind, The 1997 ASCD Yearbook* (pp. 1-26). Alexandria, VA: ASCD.

- Hargreaves, A. (1998). The emotional practice of teaching. *Teaching and Teacher Education, 14*, 835-854.
- Hargreaves, A. (2000). Mixed emotions: Teachers' perceptions of their interactions with students. *Teaching and Teacher Education, 16*, 811-826.
- Hargreaves, A. (2001). The emotional geographies of teachers' relations with colleagues. *International Journal of Educational Research, 35*, 503-527.
- Hargreaves, A. (2005). Educational change takes ages: Life, career and generational factors in teachers' emotional responses to educational change. *Teaching and Teacher Education, 21*(8), 967-983. doi: 10.1016/j.tate.2005.06.007
- Hargreaves, A. (2011). Emotional politics of teaching and teacher development: With implications for educational leadership. *International Journal of Leadership in Education: Theory and Practice, 1*(4), 315-336. doi: 10.1080/1360312980010401
- Harvey, P. (2014). Using an expectancy-value model to identify Christian school teachers' motivations for postgraduate study. *Torch Trinity Journal, 17*, 239-258.
- Heck, R. H., & Thomas, S. L. (2015). *An Introduction to Multilevel Modeling Techniques: MLM and SEM Approaches Using Mplus* (3rd Edition). New York, NY: Routledge.
- Hidi, S., & Renninger, K. A. (2006). The four-phase model of interest development. *Educational Psychologist, 41*(2), 111-127. doi: 10.1207/s15326985ep4102_4
- Hill, H. C., Beisiegel, M., & Jacob, R. (2013). Professional development research: Consensus, crossroads, and challenges. *Educational Researcher, 42*(9), 476-487. doi: 10.3102/0013189X13512674
- Howard, G. S., & Dailey, P. R. (1979). Response-shift bias: A source of contamination of self-report measures. *Journal of Applied Psychology, 64*, 144-150.
- Howland, J., & Wedman, J. (2004). A process model for faculty development: Individualizing technology learning. *Journal of Technology and Teacher Education, 12*, 239-263.

- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1). doi: 10.1080/10705519909540118
- Hulleman, C. S., Godes, O., Hendricks, B. L., & Harackiewicz, J. M. (2010). Enhancing interest and performance with a utility value intervention. *Journal of Educational Psychology*, 102(4), 880-895. doi: 10.1037/a0019506
- Ingvarson, L., Meiers, M., & Beavis, A. (2005). Factors affecting the impact of professional development programs on teachers' knowledge, practice, student outcomes & efficacy. *Education Policy Analysis Archives*, 13, 1-27.
- Intrator, S. (2006). Beginning teachers and emotional drama in the classroom. *Journal of Teacher Education*, 57, 232-239.
- Jacobs, J., Burns, R. W., & Yendol-Hoppey, D. (2015). The inequitable influence that varying accountability contexts in the United States have on teacher professional development. *Professional Development in Education*. doi: 10.1080/19415257.2014.994657
- Jacobs, J., Lanza, S., Osgood, D. W., Eccles, J. S., & Wigfield, A. (2002). Ontogeny of children's self-beliefs: Gender and domain differences across grades one through 12. *Child Development*, 73, 509-527.
- Jeffrey, B., & Woods, P. (1996). Feeling deprofessionalized: The social construction of emotions during an OFSTED inspection. *Cambridge Journal of Education*, 26(3), 325-343.
- Johnson, M. L., & Sinatra, G. M. (2014). The influence of approach and avoidance goals on conceptual change. *Journal of Educational Research*, 107(4), 312-325. doi: 10.1080/00220671.2013.807492
- Jones, S. H., Johnson, M. L., & Campbell, B. D. (2015). Hot factors for a cold topic: Examining the role of task-value, attention allocation, and engagement on conceptual change. *Contemporary Educational Psychology*, 42, 62-70. doi: 10.1016/j.cedpsych.2015.04.004

- Ju, C., Lan, J., Li, Y., Feng, W., & You, X. (2015). The mediating role of workplace social support on the relationship between trait emotional intelligence and teacher burnout. *Teachers and Teacher Education, 51*, 58-67. doi: 10.1016/j.tate.2015.06.001
- Jurasaitė-Harbison, E., & Rex, L. A. (2010). School cultures as contexts for informal teacher learning. *Teaching and Teacher Education, 26*, 267-277. doi: 10.1016/j.tate.2009.03.012
- Karabenick, S. A., & Conley, A. (2011). *Teacher motivation for professional development: Math and Science Partnership - Motivation Assessment Program*. Ann Arbor, MI: University of Michigan.
- Karabenick, S. A., & Noda, P. A. C. (2010). Professional development implications of teachers' beliefs and attitudes towards English Language Learners. *Bilingual Research Journal, 28*(1), 55 -75. doi: 10.1080/15235882.2004.10162612
- Keller, M. M., Chang, M., Becker, E. S., Goetz, T., & Frenzel, A. C. (2014). Teachers' emotional experiences and exhaustion as predictors of emotional labor in the classroom: An experience sampling study. *Frontiers in Psychology, 5*, 1-10. doi: 10.3389/fpsyg.2014.01442
- Klassen, R. M., Al-Dhafri, S., Hannok, W., & Betts, S. M. (2011). Investigating pre-service teacher motivation across cultures using the Teachers' Ten Statements Test. *Teaching and Teacher Education, 27*, 579-588. doi: 10.1016/j.tate.2010.10.012
- Klassen, R. M., & Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: Teacher gender, years of experience, and job stress. *Journal of Educational Psychology*
- Klassen, R. M., & Tze, V. M. C. (2014). Teachers' self-efficacy, personality, and teaching effectiveness: A meta-analysis. *Educational Research Review, 12*, 59-76. doi: 10.1016/j.edurev.2014.06.001
- Klassen, R. M., Bong, M., Usher, E. L., Chong, W. H., Huan, V. S., Wong, I. Y., & Georgiou, T. (2009). Exploring the validity of a teachers' self-efficacy scale in five countries. *Contemporary Educational Psychology, 34*(1), 67-76.
- Knight, J. (2011). *Unmistakable impact: A partnership approach to dramatically improving instruction*. Thousand Oaks, CA: Corwin.

- Kooy, M. (2006). The telling stories of novice teachers: Constructing teacher knowledge in book clubs. *Teaching and Teacher Education*, 22(6), 661-674. doi:10.1016/j.tate.2006.03.010
- Kosovich, J. J., Hulleman, C. S., Barron, K. E., & Getty, S. (2014). A practical measure of student motivation: Establishing validity evidence for the expectancy-value-cost scale in middle school. *Journal of Early Adolescence*, 35(5-6), 790-816. doi:10.1177/0272431614556890
- Kunter, M., Tsai, Y.-M., Klusmann, U., Brunner, M., Krauss, S., Baumert, J. (2008). Students' and mathematics teachers' perceptions of teacher enthusiasm and instruction. *Learning and Instruction*, 18, 468-482.
- Kwakman, K. (2003). Factors affecting teachers' participation in professional learning activities. *Teaching and Teacher Education*, 19, 149-170. doi: 10.1016/S0742-051X(02)00101-4
- Lasky, S. (2005). A sociocultural approach to understanding teacher identity, agency and professional vulnerability in a context of secondary school reform. *Teaching and Teacher Education*, 21(8), 899-916.
- Lawless, K. A., & Pellegrino, J. W. (2007). Professional development in integrating technology into teaching and learning: Knowns, unknowns and ways to pursue better questions and answers. *Review of Educational Research*, 71, 575-614.
- Lazarus, R. S. (1991). Process on a cognitive-motivational-relational theory of emotion. *American Psychologist*, 46(8), 819-834.
- Lee, J. C.-K., & Yin, H.-B. (2011). Teachers' emotions and professional identity in curriculum reform: A Chinese perspective. *Journal of Educational Change*, 12, 25-46. doi: 10.1007/s10833-010-9149-3
- Lee, J. C., Zhang, Z., & Yin, H. (2011). A multilevel analysis of the impact of a professional learning community, faculty trust in colleagues and collective efficacy on teacher commitment to students. *Teaching and Teacher Education*, 27(5), 820-830. doi:10.1016/j.tate.2011.01.006

- Lee, J., C.-K., Huang, Y. X.-H., Law, E. H.-F., & Wang, M.-H. (2013). Professional identities and emotions of teachers in the context of curriculum reform: A Chinese perspective. *Asia-Pacific Journal of Teacher Education*, 41(3), 271-287. doi: 10.1080/1359866X.2013.809052
- Leithwood, K., & Beatty, B. (2008). *Leading with teacher emotions in mind*. Thousand Oaks, CA: Sage.
- Lewin, K. (1936). *Principles of topological psychology*. New York, NY: McGraw-Hill.
- Li, J., & Greenhow, C. (2015). Scholars and social media: Tweeting in the conference backchannel for professional learning. *Educational Media International*, 52(1), 1-14. doi:10.1080/09523987.2015.1005426
- Little, J. W. (1987). Teachers as colleagues. In V. Richardson-Koehler (Ed.), *Educators' Handbook: A Research Perspective* (pp. 491–518). New York: Longman.
- Little, J. W. (1993). Teachers' professional development in a climate of educational reform. *Educational Evaluation and Policy Analysis*, 15(2), 129-51
- Little, J. W., & Bartlett, L. (2002). Career and commitment in the context of comprehensive school reform. *Teachers and Teaching: Theory and Practice*, 8(3/4), 345–354.
- Long, R. (2014). Federal investments in professional development: What do 50 years of experience tell us about what it takes to make a difference? In L. E. Martin, S. Kragler, D. J. Quatroche, and K. L. Bauserman (Eds.), *Handbook of professional development in education: Successful models and practices, PreK-12* (pp. 22-41). New York, NY: Guilford.
- Looby, A., De Young, K. P., & Earleywine, M. (2013). Challenging expectancies to prevent nonmedical prescription stimulant use: A randomized, controlled trial. *Drug and Alcohol Dependence*, 132(1-2), 362-368. doi: 10.1016/j.drugalcdep.2013.03.003
- Luke, D. A. (2004) *Multilevel Modeling*. Thousand Oaks, CA: SAGE University Press.

- Lydon, S., & King, C. (2009). Can a single, short continuing professional development workshop cause change in the classroom?. *Professional Development in Education*, 35(1), 63-82.
- Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin*, 131(6), 803–855.
- Malmberg, L.-E., & Hagger, H. (2010). Changes in student teachers' agency beliefs during a teacher education year, and relationships with observed classroom quality, and day-to-day experiences. *British Journal of Educational Psychology*, 79(4), 677-694. doi: 10.1348/000709909X454814
- Marsh, C. (1982). *The Survey Method: The Contribution of Surveys to Sociological Explanation*. London, UK: Allen & Unwin.
- McClintock, J. (2014, Jan 2). Why teachers hate professional development [Web log post]. Retrieved from <http://www.resources4educators.com/thoughts/why-teachers-hate-professional-development>
- McCutchen, D., Abbott, R. D., Green, L. B., Beretvas, S. N., Cox, S., Potter, N. S., et al. (2002). Beginning literacy: Links among teacher knowledge, teacher practice, and student learning. *Journal of Learning Disabilities*, 35(1), 69–86.
- Mehta, P. D., & Neale, M. C. (2005). People are variables too: Multilevel structural equations modeling. *Psychological Methods*, 10(3), 259-284. doi: 10.1037/1082-989X.10.3.259
- Messiou, K., & Ainscow, M. (2015). Responding to learner diversity: Student views as a catalyst for powerful teacher development? *Teaching and Teacher Education*, 51, 246-255. doi: 10.1016/j.tate.2015.07.002
- Miller, R. B., DeBacker, T. K., & Greene, B. A. (1999). Perceived instrumentality and academics: The link to task valuing. *Journal of Instructional Psychology*, 26(4), 250-260.
- Moors, A., Ellsworth, P. C., Scherer, K. R., & Frijda, N. H. (2013). Appraisal theories of emotion: State of the art and future development. *Emotion Review*, 5(2), 119-124.

- Muthén, L. K., & Muthén, B. O. (2015). *Mplus User's Guide* (7th Edition). Los Angeles, CA: Muthén & Muthén.
- Muthén, B. O., & Asparouhov, T. (2009). Multilevel regression mixture analysis. *Statistics in Society*, *172*(3), 639-657. doi: 10.1111/j.1467-985X.2009.00589.x
- Muthén, B. O., & Satorra, A. (1995). Complex sample data in structural equation modeling. *Sociological Methodology*, *25*, 216-31
- Nagengast, B., Marsh, H. W., Scalas, L. F., Xu, M. K., Hau, K.-T., & Trautwein, U. (2011). Who took the “x” out of Expectancy-Value Theory? A psychological mystery, a substantive-methodological synergy, and a cross-national generalization. *Psychological Science*, *22*(8), 1058-1066. doi: 10.1177/0956797611415540
- Nagengast, B., Trautwein, U., Kelava, A., & Lüdtke, O. (2013). Synergistic effects of expectancy and value on homework engagement: The case for a within-person perspective. *Multivariate Behavioral Research*, *48*(3), 428-460: doi: 10.1080/00273171.2013.775060
- Nir, A. E., & Bogler, R. (2008). The antecedents of teacher satisfaction with professional development programs. *Teaching and Teacher Education*, *24*, 377-386. doi: 10.1016/j.tate.2007.03.002
- Opfer, V. D., & Pedder, D. (2011). Conceptualizing teacher professional learning. *Review of Educational Research*, *81*(3), 37-407. doi: 10.3102/0034654311413609
- Osborn-Lampkin, L., Folsom, J. S., & Herrington, C. D. (2015). *A systematic review of the relationships between principal characteristics and student achievement* (REL 2016–091). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Southeast. Retrieved from <http://ies.ed.gov/ncee/edlabs>.
- Osipova, A., Prichard, B., Boardman, A. G., Kiely, M. T., & Carroll, P. E. (2011). Refocusing the lens: Enhancing elementary special education reading instruction through video self-reflection. *Learning Disabilities Research & Practice*, *26*(3), 158-171.

- Osman, D. J., Maddocks, D. L. A., Warner, J., & Schallert, D. L. (2015, Apr). *Teachers' emotions during professional development "Broaden and Build."* Paper presented at the American Educational Research Association 2015 Annual Meeting, Chicago, IL.
- Osman, D. J. & Warner, J. R. (2016, June). *Teacher motivation after professional development: Creation of a new scale to measure teachers' expectancy, value, and cost for implementing PD.* Paper presented at Texas Association of Teacher Educators (TxATE) 2016 Summer Conference, Austin, TX.
- Osman, D. J., Warner, J. R., Gaines, R. E., Maddocks, D. L. S., Schallert, D. L., Freeman, J. L. & Kroll, S. (2016, April). *The emotional underbelly of professional development: Quantitative and qualitative perspectives on teachers' experiences during Professional Development.* Paper presented at the American Educational Research Association 2016 Annual Meeting, Washington, DC.
- Parise, L. M., Finkelstein, C., & Alterman, E. (2015). *"We always want to get better": Teachers' Voices on Professional development.* New York, NY: MDRC.
Retrieved from www.mdrc.org
- Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review, 18*, 315-341. 10.1007/s10648-006-9029-9
- Pekrun, R. & Bühner, M. (2014). Self-report measure of academic emotions. In R. Pekrun & L. Linnenbrink-Garcia (Eds.), *International handbook of emotions in education* (pp. 561-579). New York, NY: Routledge.
- Pekrun, R., & Perry, R. P. (2014). Control-value theory of achievement emotions. In R. Pekrun and L. Linnenbrink-Garcia (Eds.), *International Handbook of Emotions in Education* (pp. 120-141). New York, NY: Routledge.
- Penuel, W. R., Fishman, B. J., Yamaguchi, R., & Gallagher, L. P. (2007). What makes professional development effective? Strategies that foster curriculum implementation. *American Educational Research Journal, 44*(4), 921-958. doi: 10.3102/0002831207308221
- Penk, C., & Schipolowski, S. (2015). Is it all about value? Bringing back the expectancy component to the assessment of test-taking motivation. *Learning and Individual Differences, 42*, 27-35. doi: 10.1016/j.lindif.2015.08.002

- Philipp, A., & Schüpbach, H. (2010). Longitudinal effects of emotional labour on emotional exhaustion and dedication of teachers. *Journal of Occupational Health Psychology, 15*(4), 494-504. doi: 10.1037/a0021046
- Plutchik, R. (2001). The Nature of Emotions Human emotions have deep evolutionary roots, a fact that may explain their complexity and provide tools for clinical practice. *American Scientist, 89*(4), 344-350.
- Pöhlmann, K. (2001). Agency- and communion-orientation in life goals: Impacts on goal pursuit strategies and psychological well-being. In P. Schmuck & K. M. Sheldon (Eds.), *Life goals and well-being: Towards a positive psychology of human striving* (pp. 68 – 84). Seattle, WA: Hogrefe and Huber.
- Pornprasertmanit, S., Lee, J., & Preacher, K. J. (2014). Ignoring clustering in confirmatory factor analysis: Some consequences for model fit and standardized parameter estimates. *Multivariate Behavioral Research, 49*, 518-543. doi: 10.1080/00273171.2014.933762
- Pratt, C. C., McGuigan, W. M., & Katzev, A. R. (2000). Measuring program outcomes: using retrospective pretest methodology. *American Journal of Evaluation, 21*(3), 341-349.
- Putnam, R. T., & Borko, H. (2000). What do new views of knowledge and thinking have to say about research on teacher learning? *Educational Researcher, 29*(4), 4-15. doi: 10.3102/0013189X029001004
- Rabe-Hesketh, S., Skrondal, A., & Pickles, A. (2004). Generalized multilevel structural equation modeling. *Psychometrika, 69*(2), 167-190.
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical Linear Models: Applications and Data Analysis Methods*. Thousand Oaks, CA: Sage.
- Reed, D. (2009). A synthesis of professional development on the implementation of literacy strategies for middle school content area teachers. *Research in Middle Level Education, 32*(10), 1-12. doi: 10.1080/19404476.2009.11462063
- Reio, Jr., T. G. (2005). Emotions as a lens to explore teacher identity and change: A commentary. *Teaching and Teacher Education, 21*, 985-993. doi: 10.1016/j.tate.2005.06.008

- Reio Jr., T. G. (2011). Teacher emotions and socialization-related learning in the context of educational change. In C. Day & J. C.-K. Lee (Eds.), *New understandings of teachers' work* (pp. 105-118). New York, NY: Springer.
- Remillard, J. T. (2005). Examining key concepts in research on teachers' use of mathematics curricula. *Review of Educational Research, 75*(2), 211-246.
- Richardson, P. W., Karabenick, S. A., & Watt, H. M. G. (2014). Teacher motivation matters. In P. W. Richardson, S. A. Karabenick, and H. M. G. Watt (Eds.), *Teacher Motivation: Theory and Practice* (pp. xi – xxii). New York, NY: Routledge.
- Rijdt, C. D., Stes, A., van der Vleuten, C., & Dochy, F. (2013) Influencing variables and moderators of transfer of learning to the workplace within the area of staff development in higher education: Research review. *Educational Research Review, 8*, 48-74. doi: 10.1016/j.edurev.2012.05.007
- Ritchie, S. M., & Rigano, D. M. (2002). Discourses about a teacher's self-initiated change in praxis: Storylines of care and support. *International Journal of Science Education, 24*(10), 1079–1094.
- Robinson, M. D., & Clore, G. L. (2002). Belief and feeling: Evidence for an accessibility model of emotional self-report. *Psychological Bulletin, 128*, 934-960.
- Rosenshine, B., & Stevens, R. (1986). Teaching functions. In M. C. Wittrock (Ed.), *Handbook of Research on Teaching* (3rd ed., pp. 376–391). New York: Macmillan.
- Russell, J. A. (2003). Core affect and the psychological construction of emotion. *Psychological Review, 110*(1), 145.
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*, 54-67.

- Rytivaara, A., & Kershner, R. (2012). Co-teaching as a context for teachers' professional learning and joint knowledge construction. *Teaching and Teacher Education*, 28(7), 999-1008. doi:10.1016/j.tate.2012.05.006
- Salanova, M., Bakker, A. B., Llorens, S. (2006). Flow at work: Evidence for an upward spiral of personal and organizational resources. *Journal of Happiness Studies*, 7, 1-22. doi: 10.1007/s10902-005-8854-8
- Sanna, L. J., Panter, A. T., Cohen, T. R., & Kennedy, L. A. (2011). Planning the future and assessing the past: Temporal biases and debiasing in program evaluation. In M. M. Mark, S. I. Donaldson, & B. Campbell (Eds.), *Social psychology and evaluation* (pp. 166 – 186). New York, NY: Guilford.
- Santagata, R., Kersting, N., Givvin, K. B., & Stigler, J. W. (2011). Problem implementation as a lever for change: An experimental study of the effects of a professional development program on students' mathematics learning. *Journal of Research on Educational Effectiveness*, 4, 1–24.
- Sato, K., & Kleinsasser, R. C. (2004). Beliefs, practices, and interactions of teachers in a Japanese high school English department. *Teaching and Teacher Education*, 20(8), 797-816. doi: 10.1016/j.tate.2004.09.004
- Saunders, J. Y., Parsons, S. C., Mwavita, M., & Thomas, K. (2015). A collaborative autoethnography of literacy professional development work in a high-needs environment. *Studying Teacher Education*, 11(3), 228-245. doi: 10.1080/17425964.2015.1071251
- Saunders, R. (2013). The role of teacher emotions in change: Experiences, patterns and implications for professional development. *Journal of Educational Change*, 14(3), 303–333.
- Schmidt, M., & Datnow, A. (2005). Teachers' sense-making about comprehensive school reform: The influence of emotions. *Teaching and Teacher Education*, 21, 949-965. doi: 10.1016/j.tate.2005.06.006
- Schmoker, M. (2015, October 20). It's time to restructure teacher professional development. *Education Week*, 35(9), 18-19.

Schunk, D. H. (1991). Self-efficacy and academic motivation. *Educational psychologist*, 26(3-4), 207-231.

Schutte, N. S. (2013). The broaden and build process: Positive affect, ratio of positive to negative affect and general self-efficacy. *The Journal of Positive Psychology*, 9(1), 66-74. doi: 10.1080/17439760.2013.841280

Schutz, P. A. (2014). Inquiry on teachers' emotion. *Educational Psychologist*, 49(1), 1-12. doi: 10.1080/00461520.2013.864955

Schutz, P. A., Aultman, L. P., & Williams-Johnson, M. R. (2009). Educational psychology perspectives on teachers' emotions. In P. A. Schutz and M. Zembylas (Eds.), *Advances in Teacher Emotion Research: The Impact on Teachers' Lives* (pp. 195-215). New York, NY: Springer.

Schutz, P. A., Cross, D. I., Hong, J. Y., & Osbon, J. N. (2007). Teacher identities, beliefs and goals related to emotions in the classroom. In P. A. Schutz and R. Pekrun, *Emotion in Education* (pp. 223-241). San Diego, CA: Elsevier Inc.

Schutz, P. A., Crowder, K. C., & White, V. E. (2001). The development of a goal to become a teacher. *Journal of Educational Psychology*, 93(2), 299-308. doi: 10.1037/0022-0663.93.2.299

Schutz, P. A., DeCuir-Gunby, J. T., & Williams-Johnson, M. R. (2016). Using multiple and mixed methods to investigate emotions in educational contexts. In M. Zembylas and P. A. Schutz (Eds.), *Methodological Advances in Research on Emotion and Education* (pp. 217-229). Switzerland: Springer International. doi: 10.1007/978-3-319-29049-2_17

Schutz, P. A., Hong, J. Y., Cross, D. I., & Osbon, J. N. (2006). Reflections on investigating emotions among educational contexts. *Educational Psychology Review*, 18, 343-360.

Scott, C., & Sutton, R. E. (2009). Emotions and change during professional development for teachers: A mixed methods study. *Journal of Mixed Methods Research*, 3(2), 151-171. doi: 10.1177/1558689808325770

Scott-Sheldon, L. A. J., Terry, D. L., Carey, K. B., Garey, L., & Carey, M. P. (2013). *Psychology of Addictive Behaviors*, 26(3), 393-405. doi: 10.1037/a0027565

- Shechter, O. G., Durik, A. M., Miyamoto, Y., & Harackiewicz, J. M. (2011). The role of utility value in achievement behavior: The importance of culture. *Personality and Social Psychology Bulletin*, 37(3), 303-317. doi: 10.1177/0146167210396380
- Shteiman, Y., Gidron, A., Eilon, B., & Katz, P. (2010). Writing as a journey of professional development for teacher educators. *Professional Development in Education*, 36(1-2), 339-356.
- Shuman, V., & Scherer, K. R. (2014). Concepts and structures of emotions. In R. Pekrun and L. Linnenbrink-Garcia (Eds.), *International Handbook of Emotions in Education* (pp. 36-55). New York, NY: Routledge.
- Simmons, A. (2016, Aug 8). 4 reasons why teachers hate professional development [Web log post]. Retrieved from <https://www.linkedin.com/pulse/4-reasons-why-teachers-hate-professional-development-simmons-m-ed>
- Simpkins, S. D., Davis-Kean, P. E., & Eccles, J. S. (2006). Math and science motivation: A longitudinal examination of the links between choices and beliefs. *Developmental Psychology*, 42(1), 70-83. doi: 10.1037/0012-1649.42.1.70
- Skaalvik, E. M., & Skaalvik, S. (2010). Teacher self-efficacy and teacher burnout: A study of relations. *Teaching and Teacher Education*, 26(4), 1059-1069. doi: 10.1016/j.tate.2009.11.001
- Slavit, D., Sawyer, R., & Curley, J. (2003). Filling your plate: A professional development model for teaching with technology. *TechTrends*, 47, 35-38.
- Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology*, 48(4), 813-838.
- Smith, J. M., Kovacs, P. E. (2011). The impact of standards-based reform on teachers: The case of 'No Child Left Behind.' *Teachers and Teaching: Theory and Practice*, 17(2), 201-225.
- Snyder, T. D., & Dillow, S. A. (2015) *Digest of education statistics 2013* (NCES 2015-011): *Schools and Staffing Survey, Public and Private School Teachers: 2011-2012*. National Center for Education Statistics, Institute of Education Sciences, US Department of Education. Washington, DC.

- Spillane, J. P., Reiser, B. J., & Reimer, T. (2002). Policy implementation and cognition: Reframing and refocusing implementation research. *Review of Educational Research, 72*, 387-431. doi: 10.3102/00346543072003387
- Stanulis, R. N., Little, S., & Wibbens, E. (2012). Intensive mentoring that contributes to change in beginning elementary teachers' learning to lead classroom discussions. *Teaching and Teacher Education, 28*(1), 32-43. doi:10.1016/j.tate.2011.08.007
- Steinert, Y., Macdonald, M. E., Boillat, M., Elizov, M., Sarkis, M., Saleem, R., Ouellet, M.-N., & McLeod, P. J. (2010). Faculty development: If you build it, they will come. *Medical Education, 44*(9), 900-907.
- Sutton, R. E., & Wheatley, K. F. (2003). Teachers' emotions and teaching: A review of the literature and directions for future research. *Educational Psychology Review, 15*(4), 327-385.
- Swennen, A., Volman, M. & van Essen, M. (2008). The development of the professional identity of two teacher educators in the context of Dutch teacher education, *European Journal of Teacher Education, 31*(2), 196–184.
- Taboada, M. B. (2016, Feb 15) Manor school board moves forward with separation from superintendent. *Austin-American Statesman*. Retrieved from <http://www.statesman.com>
- Taxer, J. L., & Frenzel, A. C. (2015). Facets of teachers' emotional lives: A quantitative investigation of teachers' genuine, faked, and hidden emotions. *Teaching and Teacher Education, 49*, 78-88. doi: 10.1016/j.tate.2015.03.003
- The New Teacher Project (TNTP). (2015). *The Mirage: Confronting the Hard Truth About our Quest for Teacher Development*. Brooklyn, NY: Author.
- Thomson, M. M., & Kaufmann, E. (2013). Elementary teachers' views of their science professional development attendance: An expectancy-value approach. *Eurasia Journal of Mathematics, Science & Technology Education, 9*(1), 45-58. doi: 10.12973/eurasia.2013.915a
- Tolman, E. C. (1932). *Purposive behavior in animals and men*. New York, NY: Century.

- Trautwein, U., Marsh, H. W., Nagengast, B., Lüdtke, O., Nagy, G., & Jonkmann, K. (2012). Probing for the multiplicative term in modern expectancy-value theory: A latent interaction modeling study. *Journal of Educational Psychology, 104*(3), 763-777. doi: 10.1037/a0027470
- Tschannen-Moran, M., & Chen, J. A. (2014). Focusing attention on beliefs about capability and knowledge in teachers' professional development. In L. E. Martin, S. Kragler, D. J. Quatroche, and K. L. Bauserman (Eds.), *Handbook of professional development in education: Successful models and practices, PreK-12* (pp. 246-265). New York, NY: Guilford.
- Tschannen-Moran, M., & McMaster, P. (2009). Sources of self-efficacy; Four professional development formats and their relationship to self-efficacy and implementation of a new teaching strategy. *The Elementary School Journal, 110*(2), 228-245. doi: 10.1086/605771
- Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*(7), 783-805.
- Turner, J. E., Waugh, R. M., Summers, J. J., & Grove, C. M. (2009). Implementing high-quality educational reform efforts: An interpersonal circumplex model bridging social and personal aspects of teachers' motivation. In P. A. Schutz & M. Zembylas (Eds.), *Advances in Teacher Emotion Research: The Impact on Teachers' Lives*, (pp. 253-271). New York, NY: Springer. doi: 10.1007/978-1-4419-0564-2_13
- U. S. Department of Education, National Center for Education Statistics. (2012). *Schools and Staffing Survey (SASS), "Public School Teacher Data File."* Retrieved from http://nces.ed.gov/surveys/sass/tables/sass1112_2013314_t1s_008.asp
- Van Eekelen, I.M., Vermunt, J. D., & Boshuizen, H. P. A. (2006). Exploring teachers' will to learn. *Teaching and Teacher Education, 22*, 408-423. doi: 10.1016/j.tate.2005.12.001
- van Veen, K., & Slegers, P. (2006). How does it feel? Teachers' emotions in a context of change. *Journal of Curriculum Studies, 38*(1), 85-111.

- Visser, R. D., Evering, L. C., & Barrett, D. E. (2014). #TwitterforTeachers: The implications of Twitter as a self-directed professional development tool for K-12 teachers. *Journal of Research on Technology in Education*, 46(4), 396-413. doi: 10.1080/15391523.2014.925694
- Voogt, J., Laferrière, T., Breuleux, A., Itow, R. C., Hickey, D. T., & McKenney, S. (2015). Collaborative design as a form of professional development. *Instructional Science*, 43(2), 259-282. doi:10.1007/s11251-014-9340-7
- Warner, J. R., & Osman, D. J. (2017, April) *Teachers' expectancies, values, and perceived costs: A scale to measure teachers' motivation after professional development*. Poster presented at the American Educational research Association 2017 Annual Meeting, San Antonio, TX.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063-1070.
- Watt, H. M. G., & Richardson, P. W. (2008). Motivations, perceptions, and aspirations concerning teaching as a career for different types of beginning teachers. *Learning and Instruction*, 18(5), 408-428. doi: 10.1016/j.learninstruc.2008.06.002
- Wei, R., Darling-Hammond, L., Andree, A., Richardson, N., & Orphanos, S. (2009). *Professional Learning in the Learning Profession: A Status Report on Teacher Development in the United States and Abroad*. Dallas, TX: National Staff Development Council. Retrieved from www.learningforward.org
- Weiss, H. M., & Brief, A. P. (2001). Affect at work: A historical perspective. In R. Payne & C. Cooper (Eds.), *Emotions at work: Theory, research and applications for management*. New York, NY: John Wiley & Sons.
- Whitaker, T., Whitaker, B., & Lumpa, D. (2013). *Motivation and inspiring teachers: The educational leader's guide for building staff morale* (2nd Edition). New York, NY: Taylor & Francis.
- Wieczorek, D., & Theoharis, G. (2016). "We're Going to Make Lemonade Out of Lemons" Urban Principals, Emotion, and Race to the Top Implementation. *NASSP Bulletin*, doi:0192636516636960.

- Wigfield, A., Eccles, J. S., & Rodriguez, D. (1998). The development of children's motivation in school contexts. *Review of Research in Education, 23*, 73-118.
- Wigfield, A., Eccles, J. S., Schiefele, U., Roeser, R. W., & Davis-Kean, P. (2006). Development of Achievement Motivation. In N. Eisenberg, W. Damon, R. M. Lerner (Eds.), *Handbook of child psychology: Vol. 3, Social, emotional, and personality development* (6th ed.) (pp. 933-1002). Hoboken, NJ: John Wiley & Sons.
- Wigfield, A., Tonks, S., & Klauda, S. L. (2009). Expectancy-Value Theory. In K. R. Wenzel & A. Wigfield (Eds.), *Handbook of Motivation at School* (pp. 77-104). New York, NY: Routledge.
- Wilson, S. M. & Berne, J. (1999). Teacher learning and the acquisition of professional knowledge: An examination of research on contemporary professional development. *Review of Research in Education, 24*, 173-209.
- Wlodkowski, R. J. (2008). *Enhancing adult motivation to learn: A comprehensive guide for teaching all adults*. San Francisco, CA: Jossey-Bass.
- Wonderland, A. (2014, July 23). PD: Professional deprofessionalization [Web log post]. Retrieved from <https://allisunrae.wordpress.com/2014/07/23/pd-professional-deprofessionalization/>
- Woolfolk Hoy, A., Davis, H., & Pape, S. J. (2006). Teacher knowledge and beliefs. In P. A. Alexander, & P. H. Winne (Eds.), *Handbook of Educational Psychology, 2nd ed.* (pp. 715-737). New York, NY: Routledge
- Wozney, L., Venkatesh, V., & Abrami, P. C. (2006). Implementing computer technologies: Teachers' perceptions and practices. *Journal of Technology and Teacher Education, 14*(1), 173-207.
- Yin, H.-B., & Lee, J. C.-K. (2011). Emotions matter: Teachers' feelings about their interactions with teacher trainers during curriculum reform. *Chinese Education and Society, 44*(4), 82-97. doi: 10.2753/CED1061-1932440405

- Yoon, K. S., Duncan, T., Lee, S. W.-Y., Scarloss, B., & Shapley, K. (2007). *Reviewing the Evidence on How Teacher Professional Development Affects Student Achievement* (Issues & Answers Report, REL 2007-No. 033). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Southwest. Retrieved from <http://ies.ed.gov/ncee/edlabs>
- Zembylas, M. (2003). Emotions and teacher identity: A poststructural perspective. *Teachers and Teaching: Theory and Practice*, 9(3), 213–238.
- Zembylas, M. (2005). Discursive practices, genealogies, and emotional rules: A poststructuralist view on emotion and identity in teaching. *Teaching and Teacher Education*, 21(8), 935-948.
- Zembylas, M. (2010). Teachers' emotional experiences of growing diversity and multiculturalism in schools and the prospects of an *ethic of discomfort*. *Teachers and Teaching*, 16(6), 703-716. doi:
- Zhao, F., & Frank, K. A. (2003). Factors affecting technology uses in schools: An ecological perspective. *American Educational Research Journal*, 40(4), 807-840. doi: 10.3102/00028312040004807
- Zimmerman, B. J., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal setting. *American Educational Research Journal*, 29(3), 663-676.

Vita

I, David J. Osman, was born in Missouri before moving to Texas on my first birthday in a red Ford Pinto. Apparently, I cried the whole drive to Texas. I graduated from Leander High School in 2000 and was a Texas All-State euphonium player my senior year. I attended Saint Louis University and graduated with a B.A. in History, *cum laude*. After attending college, I enrolled at The University of Texas at Austin in the UTeach – Liberal Arts program.

I taught social studies with high school students in central Texas' public schools for five years. On my first day of teaching students in special education resource classes at Pflugerville High School, a fight broke out in my class. I had a lot to learn. By the time I left teaching, though, I felt quite efficacious. The senior class at Round Rock High School named me teacher of the year, twice. I was student council sponsor and also helped out with the marching band every once in a while. I married my high school sweetheart Erin, and started a family. After teaching students, I became a social studies instructional coach and tried my hand at teaching adults. While I did not have a fist fight on my first day, I had a lot to learn.

I enrolled at Texas State University – San Marcos and earned an M.A. in Curriculum and Instruction, before returning to The University of Texas at Austin to pursue continued graduate work. While I worked towards this degree, I consulted on behalf of The University, working with teachers and public school staff to reform literacy instruction across Texas. It was exciting and fulfilling work. I recently returned to working in public schools and am now employed as the Director of Research and Evaluation in Round Rock ISD.

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This dissertation was typed by the author.