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Sources of Teaching Self-Efficacy: A Scale Validation

by

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Sources of Teaching Self-Efficacy: A Scale Validation

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An abstract of
A dissertation submitted to the Faculty of the
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Abstract

Sources of Teaching Self-Efficacy: A Scale Validation
By David B. Morris

The purpose of this study was to validate a scale designed to assess the sources of K-12 teachers' (N = 144) perceptions of efficacy. Four related objectives guided this investigation. First, I explored the psychometric properties of a scale crafted to measure the sources of teaching self-efficacy. Second, I sought to identify the independent contribution of each of the hypothesized sources to self-efficacy. Third, I assessed mean differences in the sources of teaching self-efficacy as a function of teachers' experience and level of education. Fourth, I examined the relationships among teaching self-efficacy, it sources, and teachers' satisfaction, stress, collective efficacy, optimism, authenticity, and invitations. Through analysis of descriptive statistics and factor analysis, I reduced the initial pool of 61 items to an 18-item scale. The retained scale included four subscales corresponding to the four sources hypothesized by Bandura. Social persuasions and physiological and affective states predicted teachers' overall self-efficacy. Teachers who had more than five years of experience reported more positive and less negative mastery experiences and social persuasions than did those with five or less years of experience. The hypothesized sources did not differ as a function of teachers' level of education. Teaching self-efficacy was weakly and often nonsignificantly related to positive psychology constructs (i.e., teachers' authenticity, optimism, and invitations). The four hypothesized sources tended to be moderately associated with these variables. This study represents an encouraging though preliminary step in the measurement of the sources of teachers' self-efficacy.

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CHAPTER I
INTRODUCTION

As part of his social cognitive theory, Albert Bandura (1997) argued that *self-efficacy*, defined as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3), are central to the exercise of human agency. These self-beliefs have been found to predict the effort people put forth, how well they persevere when faced by obstacles, how effectively they monitor and motivate themselves, what they achieve, and the choices they make in life (Bandura, 1997). For this reason, researchers have devoted considerable attention to how self-efficacy influences the motivation and behaviors of individuals in academic settings (Pajares, 2006).

Though much of this work has focused on students, researchers have documented that the self-efficacy of teachers is also critical in the functioning of a classroom. Self-efficacious teachers typically reflect on their experiences more adaptively, plan and organize more effectively, are more likely to employ and seek out engaging instructional strategies, put forth greater effort in motivating their students, and are more resilient when faced by obstacles than are teachers with lower self-efficacy (Ashton & Webb, 1986; Midgley, Feldlaufer, & Eccles, 1988; Tschannen-Moran et al., 1998; Woolfolk Hoy & Davis, 2006). Moreover, students of teachers with higher self-efficacy tend to have higher expectations of themselves, perform better on standardized tests, and report higher academic self-efficacy (Allinder 1995; Anderson, Greene, & Loewen, 1988; Ross, Hogaboam-Gray, & Hannay, 2001). Given the considerable benefits associated with teachers' self-efficacy, researchers have begun to turn their attention toward the sources underlying these important beliefs.

According to Bandura's (1986, 1997) social cognitive theory, individuals develop their self-efficacy by attending to four sources of capability-related information. These four sources are mastery experiences, vicarious experiences, social persuasions, and physiological and affective states. The most powerful of these sources is thought to be *mastery experiences*, or individuals' interpretations of their past performances. *Vicarious experiences,* in which individuals witness the successes and failures of others performing a task, may also inform perceptions of efficacy. Teachers may gauge their capabilities from observing a model, such as a masterful instructor. They may also compare themselves to a group norm, as when they weigh their own students' mean test scores against the mean for their school or district. Feedback in the form of *social persuasions*, the third source, can also inform individuals of their capabilities. Educators may judge their effectiveness by attending to the things they are told by supervisors, parents, and students. Finally, *physiological and affective states*, including stress, fatigue, anxiety, and mood, can also influence perceptions of capability. Instructors may interpret their emotions or physiological states as indications of their readiness to teach and judge their capabilities accordingly.

Statement of the Problem

A number of methodological shortcomings in the literature have prevented a clear understanding of how teachers form their efficacy beliefs. First, researchers have often assumed that the sources of preservice teachers' efficacy beliefs are identical to the sources of practicing teachers' self-efficacy. Potentially misleading results might emerge if generalizations about the sources of practicing teachers' self-efficacy beliefs are based on studies of preservice teachers (e.g., Henson, 2001a; Kieffer & Henson, 2002; Poulou, 2007). Bandura (1997) acknowledged that some sources may be particularly potent when

one engages in a novel task, and Tschannen Moran and Woolfolk Hoy (2007) have documented that the influence of sources on teaching self-efficacy can vary as a function of teachers' experience.

Second, most studies typically have not tested the independent effect of each of the four hypothesized sources on teachers' perceptions of efficacy. Some researchers have chosen to focus on only one or two of the hypothesized sources in their correlation analysis (e.g., Tschannen-Moran & Woolfolk Hoy, 2007; Woolfolk Hoy & Burke-Spero, 2005). Others have taken the approach of combining sources in their scales. For example, Poulou (2007) merged mastery experiences and social persuasions into a single subscale of items designed to assess both sources simultaneously. Combining hypothesized sources in this manner undermines the utility of a sources scale. As Usher and Pajares (2008) put forth, "results from studies that have used an aggregate score from two or more sources yield little practical information, as combining sources prevents an understanding of how [individuals] interpret each source independently" (p. 762). Including all four hypothesized sources in one model could lead researchers to more complete profile of the sources and their influence.

Third, items used to gauge the sources have often been inconsistent with social cognitive theory or poorly worded and have thus obscured what is known about how Bandura's (1997) hypothesized sources function in the teaching domain. For example, Tschannen-Moran and Woolfolk Hoy (2007) reported that correlations between social persuasions and teachers' self-efficacy beliefs were either weak or non-existent. However, assessing persuasions as "interpersonal support of administrators, colleagues, parents, and members of the community" (p. 954) may yield different results than defining them as "social evaluations of capability" (Bandura, 1997, p. 102). The former

definition is both too vague and too limiting; teachers might not think of a supervisor's evaluation as "interpersonal support." They may furthermore attend to the messages they receive from students as more important indicators of their capability as teachers. Most teacher questionnaires have also included items worded in such a way as to tap only positive (i.e., efficacy-building) experiences. Limiting questionnaires to positively-worded items may not accurately reflect the ways in which challenges affect teachers' efficacy judgments.

Fourth, the fact that teaching self-efficacy has been defined and operationalized in numerous ways has made it difficult to assess the influence of its hypothesized sources. For well over a decade, the most commonly used scale to measure teaching self-efficacy was Gibson and Dembo's (1984) Teacher Efficacy Scale (TES), but criticisms of the scale's reliability, validity, and consistency with social cognitive theory have led researchers to consider alternative scales (Guskey & Passaro, 1994; Henson, 2002; Tschannen-Moran et al., 1998). Tschannen-Moran and Woolfolk Hoy's (2001) Teachers' Sense of Efficacy Scale (TSES) has since gained increasing acceptance by researchers due to its psychometric and conceptual superiority to the TES (Chacon, 2005; Knoblauch & Hoy, 2008; Shore, 2004). Nevertheless, the TES and related scales (e.g., Science Teaching Efficacy Belief Instrument, Enochs & Riggs, 1990) continue to be widely used in studies of teaching self-efficacy (e.g., Cruz & Arias, 2007; Gencer & Cakeiroglu, 2007; Goddard & Goddard, 2001). Researchers who have been unsatisfied with these scales have offered still other scales of teaching self-efficacy (e.g., Dellinger, Bobbett, Olivier, & Ellett, 2008; Friedman & Kass, 2002). It is difficult to make generalizations about the relationships between the hypothesized sources and self-efficacy when the dependent variable (i.e., teaching self-efficacy) is not measured in a

consistent manner. Furthermore, studies that involve conceptually or psychometrically flawed scales of teaching self-efficacy may lead to inaccurate understandings of its sources.

Finally, and perhaps most important, few efforts have been made to assess the hypothesized sources of teaching self-efficacy. Some narrowly-defined scales have been used to investigate the sources of teaching self-efficacy in specific settings (e.g., Tschannen-Moran & Woolfolk Hoy, 2007; Woolfolk Hoy & Burke-Spero, 2005), but only a handful of quantitative measures have been designed to incorporate all four hypothesized sources. The first of these was a scale designed by Heppner (1994) to assess the sources of graduate student instructors' teaching self-efficacy. The small sample size ($N = 5$) prevented any statistical analysis of the scale's validity. Keiffer and Henson (2000) concluded that their sources of preservice teachers' self-efficacy scale did not withstand empirical scrutiny. A third scale created by Poulou (2007) and administered to preservice teachers in Greece included a subscale combining two of the hypothesized sources, but regression analysis revealed that three of the four antecedents failed to predict teachers' self-efficacy. Other efforts to measure the sources of self-efficacy have been only loosely related to Bandura's (1997) postulates (e.g., Weaver Shearn, 2008).

These shortcomings illustrate the need for a psychometrically sound and theoretically-based scale of the sources of teaching self-efficacy. Such a scale would provide valuable information for subsequent research efforts. As interest in the sources of teaching self-efficacy increases, so too will the demand for a scale that offers a more complete and accurate picture of the hypothesized sources. The scale may also inform future professional development, as scholars who have imposed interventions that

emphasize positive capability-related information have generally reported improvements in participants' self-efficacy (Henson, 2001a; Liaw, 2009; Ross & Bruce, 2007). In fact, from a social cognitive perspective, environmental changes (i.e., from interventions) must necessarily be interpreted by the actor (i.e., teachers) in order to alter behaviors (Bandura, 1997). Research on how interventions aimed at enhancing teachers' efficacy change the interpretations teachers make of their experiences may provide this missing link between environmental and behavioral factors. A valid scale of the sources of teaching self-efficacy (i.e., one that appears to measure the construct it is supposed to measure) may enable researchers to conduct longitudinal studies that document the ways in which training experiences influence teachers' sense of efficacy.

Purpose of the Study

The central purpose of this study is to evaluate the validity of a scale designed to assess the sources of teaching self-efficacy. I analyzed secondary data collected by Usher (2006b; see Appendix A), a portion of which had been used for two international studies (Klassen et al., 2009; Klassen, Usher, & Bong, in press). Items included in these international studies can be found in Appendix B, and items that had not yet been analyzed can be found in Appendix C. Among the unanalyzed data were items designed to assess the sources of teaching self-efficacy. Establishing a well-grounded and justifiable scale of the sources may provide a valuable tool for future research and pedagogical development.

This dissertation study had four related objectives. The first and most critical objective was to explore the psychometric properties of scales designed to assess the four hypothesized sources of teaching self-efficacy. I took several steps to evaluate the degree to which the items and scales were used accurately to represent Bandura's (1997)

hypothesized sources. For example, I asked experts to reexamine items for content validity. I also examined correlations between the sources scale and a teaching self-efficacy scale. If the events and experiences represented by subscales are indeed sources of self-efficacy, they should be associated with teachers' self-efficacy. I also subjected the data to factor analyses to see if items load onto factors corresponding to the four hypothesized sources.

The second aim was to assess the independent contribution of each of the hypothesized sources of self-efficacy to the prediction of teaching self-efficacy. Such information shed some light on the relative weight of each hypothesized source on teaching self-efficacy. Bandura (1997) posited that mastery experiences typically provide the largest contribution to perceptions of efficacy, but he maintained that the relative influence of each source will vary according to contextual factors. In the domain of teaching self-efficacy, conceptualizations of the hypothesized sources have been muddled by studies in which the sources are poorly or narrowly defined. Knowing which events most profoundly influence teachers' sense of efficacy may help clarify which experiences teacher educators should emphasize in the training of novices.

The third objective was to determine whether mean differences exist in the hypothesized sources of self-efficacy as a function of teaching experience or level of education. Research on the influence of teachers' experience on their perceptions of efficacy is mixed. Scholars have reported that experience raises (Gurvitch & Metzler, 2009), lowers (Capa Aydin & Woolfolk Hoy, 2005), or has no significant influence (Cantrell, Young, & Moore, 2003) on teachers' self-efficacy. Less is known about how teachers' level of education influences their perceptions of competence. Scholars have documented, however, that formal opportunities for teachers to improve their content and

pedagogical knowledge have enhanced their self-efficacy (Chacon, 2005; Milner & Woolfolk Hoy, 2001; Postareff, Lindblom-Ylanne, & Nevgi, 2008). The attainment of a Master's degree was therefore hypothesized to provide instructors with a powerful mastery experience. Exploring the influence of experience and level of education on the hypothesized sources can help to clarify how training programs can guide teachers to more confident performances.

Finally, I explored how teaching self-efficacy and its sources are related to other teaching-related variables. Job satisfaction, stress, and collective efficacy have been found to be correlated with teachers' sense of efficacy. Although optimism, authenticity, and invitations have also been shown to be associated with students' self-efficacy, less attention has been devoted to these variables in teacher research. Moreover, few scholars have explored the relationship of these variables and the hypothesized sources. In this study, I examined correlations between these variables, teaching self-efficacy, and its sources. Exploring the events associated with teachers' satisfaction, stress, collective efficacy, optimism, and invitations may provide clues for the training and pedagogical development of teachers.

Research Questions

The questions that guided this investigation are as follows:

1. What are the psychometric properties of a scale designed to assess the sources of teaching self-efficacy?
2. What is the independent contribution of each of the sources of teaching self-efficacy to the prediction of teachers' self-efficacy?
3. Are there mean differences in the sources of teaching self-efficacy as a function of teachers' experience and level of education?
4. What is the relationship among teaching self-efficacy, its sources, and teachers' satisfaction, stress, collective efficacy, optimism, authenticity, and invitations?

Definition of Terms

In this section, I offer readers a list of definitions of terms pertinent to the literature I am reviewing and to the research questions provided above. Terms have been defined in ways most consistent with how they have been operationalized in the literature and in this study.

- **Social Cognitive Theory:** A psychological theory in which individuals' behaviors, environment, and personal factors (e.g., cognitive, biological, and affective processes) interact in a process of triadic reciprocality. According to this theory, humans are capable of thinking symbolically, anticipating consequences of their actions, learning from others' experiences, modifying their behaviors according to personal standards, and engaging in meaningful reflection. Bandura's (1986) social cognitive theory serves as the theoretical framework for this study.

- **Collective Teacher Efficacy:** Teachers' perceptions that their school faculty as a whole will have a positive influence on students' lives and academic outcomes (Goddard, Hoy, & Woolfolk Hoy, 2000).
- **Content Knowledge:** Teachers' understanding of the materials they teach, how that material is connected to other disciplines, and how it is applied in real-world settings (National Board for Professional Teaching Standards, 2002).
- **Sources of Self-Efficacy:** Antecedents of capability-related beliefs. These may include but are not limited to the four hypothesized sources identified by Bandura (1997), which are mastery experiences, vicarious experiences, social persuasions, and physiological and affective states.
- **Invitations:** Encouraging or discouraging messages that individuals send to themselves and to others. Usher and Pajares (2006a) distinguished these messages from social persuasions as messages *sent* rather than *received*.
- **Mastery Experiences:** Individuals' appraisals of their past performances. According to Bandura (1997), mastery experiences are generally the most informative source of self-efficacy.
- **Optimism:** A positive attitude regarding one's expectations for the future (Pajares, 2001; Peterson, 2000).
- **Pedagogical Knowledge:** Teachers' knowledge of how to convey subject matter to their students. Pedagogical knowledge involves an understanding of multiple instructional strategies and their appropriate use given the background knowledge and beliefs of students (National Board for Professional Teaching Standards, 2002).

- **Physiological and Affective States:** Somatic and emotional events, including stress, fatigue, anxiety, and mood. According to Bandura (1997), physiological and affective states function as a source of self-efficacy.
- **Self-Efficacy:** "Beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3).
- **Social Persuasions:** Evaluative messages that convey capability-related information. According to Bandura (1997), social persuasions function as a source of self-efficacy.
- **Teacher Authenticity:** Teachers' beliefs that their achievements are deserved and that others recognize those achievements as merited (Seligman, 2002).
- **Teacher Satisfaction:** Teachers' positive affective responses to their jobs as a whole or to facets of their jobs (Cooley & Yovanoff, 1996)
- **Teacher Stress:** Teachers' work-related emotional strain, including frustration, anxiety, anger and depression (Kyriacou, 1987).
- **Teacher Efficacy:** A teacher's actual, as opposed to perceived, capabilities. According to the National Board for Professional Teaching Standards (2002), competent teachers (a) are committed to students and their learning, (b) know their content area and how to teach it, (c) manage and monitor student learning, (d) reflect on their practice to inform their future instruction, and (e) work collaboratively with others to improve the effectiveness of the school.
- **Teaching Self-Efficacy:** "The teacher's belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific

teaching task in a particular context" (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998).

- **Teaching Self-Efficacy for Classroom Management:** Teachers' perceptions of their capabilities to control disruptive behavior, establish an understood classroom management system, and get students to follow classroom rules (Tschannen-Moran & Woolfolk Hoy, 2001).
- **Teaching Self-Efficacy for Instructional Strategies:** Teachers' perceptions of their capabilities to craft good questions for students, implement a variety of assessment strategies, provide alternative explanations when students are confused, and implement alternative strategies (Tschannen-Moran & Woolfolk Hoy, 2001).
- **Teaching Self-Efficacy for Student Engagement:** Teachers' perceptions of their capabilities to help students value learning, motivate students who show low interest, get students to believe they can do well, and assist families in helping their children do well (Tschannen-Moran & Woolfolk Hoy, 2001).
- **Vicarious Experiences:** Experiences in which individuals witness the successes or failures of others performing a task. According to Bandura (1997), vicarious experiences function as a source of self-efficacy.

Significance of the Study

In general, individuals' self-efficacy beliefs powerfully influence their motivation and practice (Bandura, 1997). Teachers' self-efficacy affects not only their own performance, but also the motivation and achievement of their students (Woolfolk Hoy & Davis, 2006). Understanding the events that shape the self-efficacy of teachers can therefore provide clues as to how teacher educators may enhance teachers' beliefs and the

functioning of their classrooms. For this reason, Tschannen-Moran and Woolfolk Hoy (2007) contended that, "it is of both theoretical and practical importance to understand the sources teachers tap when making judgments about their capability for instruction" (p. 953).

Results of this study may provide researchers with insights as to how to best measure the sources of teachers' self-efficacy. Several scholars have addressed the sources of teaching self-efficacy, and yet, as the next chapter will reveal, few studies have assessed these antecedents in exactly the same manner. Without clear definitions or a consistent means of measuring the sources as they apply to the teaching task, research on the sources of teaching self-efficacy will continue to produce conflicting results. A valid scale of the sources can guide such investigations and expand understandings of how teachers' efficacy beliefs evolve.

Such a scale could also be used to guide teacher training efforts, particularly given that understandings of the sources have guided past interventions (e.g., Henson, 2001a; Liaw, 2009; Ross & Bruce, 2007). If, for example, vicarious experiences provide a significant contribution to teachers' sense of efficacy, professional development might emphasize opportunities to observe effective teachers. The scale might also be used to assess to degree to which an intervention provides positive experiences that in turn enhance teachers' perceptions of efficacy. By implementing the scale before and after professional development activities, researchers can explore which experiences were particularly influential in altering teachers' self-perceptions, and future interventions can be altered accordingly.

Limitations and Delimitations

There are several limitations and delimitations of this study that deserve consideration. A limitation of self-report surveys is that they fail to take into account the full context of a respondent's experiences, especially when they are not supplemented by qualitative data (Schwartz, 1999). Other potential limitations of the use of self-report data include participants' inability to remember past events and their unwillingness to disclose personal information (e.g., their private beliefs).

Another important caveat is that a cross-sectional, correlational study cannot directly document causation; causation in such cases can only be inferred from theory. Bandura's (1986) social cognitive theory is based on reciprocal, and not unilateral, determinism. That is, a mastery experience may inform teachers' self-efficacy, but self-efficacy may also make performance attainments more likely. Because the hypothesized sources are posited to be *antecedents* of these self-beliefs, however, the reciprocal relationship between the sources and self-efficacy is theoretically initiated by the sources. The distinction between the antecedents and products of self-efficacy is important but cannot be established using this type of analysis.

There are also some notable delimitations that bound inferences that can be drawn from this study. In secondary data analysis, the hypotheses that can be tested are bounded by the type of data collected (Frankfort-Nachmias & Nachmias, 2007). It bears emphasizing that the sample was composed largely of White teachers (83%) who were women (91%). This closely reflects the national population of public school K-12 teachers, of whom 83% are White and 75% are women (National Center for Educational Statistics, 2009). Some scholars have suggested that the sources of teaching self-efficacy may vary as a function of race and gender (Ross, Cousins, & Gadall, 1996; Milner &

Woolfolk Hoy, 2005; Morris, 2009). Thus, the profile of the sources of teacher self-efficacy may be different for men and for teachers of color, and these profiles cannot be accurately represented in such a study. Moreover, although I have information regarding teachers' highest levels of education, I do not know what type of degree they received. For example, a Masters in the Art of Teaching may have a different influence on teachers' self-efficacy than a Masters in Biology. Without this information, it is more difficult to distinguish the effects of these two preparatory experiences.

In a similar manner, little descriptive information was available about the students of the participants in the study. Characteristics of a classroom or school, such as class size, ability grouping, grade level, and available resources can influence teachers' sense of efficacy (Raudenbush, Rowan, & Cheong, 1992; Ross, Cousins, & Gadalla, 1996; Tschannen-Moran & Woolfolk Hoy, 2007). No information was collected with regard to students' ability groupings, class sizes, or the availability of teaching resources. The sample was also limited to teachers who taught in elementary and middle school schools. Notably, although 16% of students in the United States attend schools defined by the National Center for Educational Statistics (2009) as "high poverty," only seven percent of teachers indicated that students in their school were of low to average socioeconomic status. Therefore, caution should be used when generalizing to other populations.

CHAPTER II
REVIEW OF THE LITERATURE

In this chapter, I offer a review of literature pertinent to this investigation. I begin by summarizing the chief tenets of Albert Bandura's (1986) social cognitive theory, which serves as the theoretical framework for my study. I then review findings of studies that have focused on teachers' self-efficacy and it correlates. Next, I provide an outline of the theory that has guided research on the sources of teaching self-efficacy. This outline is followed by a review and critique of empirical findings on the hypothesized sources. Because I examined additional variables related to teachers' motivation and affect (e.g., teacher stress, teacher authenticity), I also offer a brief summary of the research on these variables and their relationship to self-efficacy and its sources. I then discuss the significance of contextual and demographic factors in the creation and maintenance of teaching self-efficacy. I close the chapter with a synthesis of the theory and research that informs the direction of this study.

Overview of Social Cognitive Theory

Albert Bandura's (1986) *social cognitive theory* provides a view of human functioning in which individuals are neither unwillingly shaped by environmental forces nor automatically determined by their genetic endowments. Instead, one's behavior, environment, and personal factors (e.g., cognitive, biological, and affective processes) are reciprocally causal. In the area of education, for example, teachers' self-beliefs (personal factors) may be altered by the presence or absence of critical resources (environmental factors), ultimately altering the expectations that teachers communicate (behavior) to their students (Henson, 2002). Similarly, instructors' poor performance in lecturing (behavior) could lead to a decrease in their confidence (personal factor) which, when

detected by students, might transform the classroom environment. The relative influence of each determinant varies according to context. For example, the self-beliefs of experienced teachers can alter the environment in a powerful manner even when the environment has little chance of changing the teachers' beliefs. Someone confident in her teaching skills may be relatively unfazed by a disinterested group of students, but her confidence may very well help create an engaged classroom environment. Above all, social cognitive theory emphasizes the capability of humans to take an active role in their own functioning.

Bandura (1986) identified five interrelated human capabilities at the heart of social cognition. These include symbolizing capability, forethought, vicarious capability, self-regulatory capability, and self-reflective capability. The first of these, the *symbolizing capability,* provides humans the tools to cognitively organize their experiences and thus informs their subsequent courses of action. For example, teachers assign meaning to the words and numbers on a summary of standardized test scores that may provide direction for their future instruction. The use of symbols is essential to *forethought*, the process by which people anticipate the consequences of their actions as they plan and set goals. In social cognitive theory, the relationship of consequence to behavior is not direct, as postulated by radical behaviorists, but is instead mediated by self-systems. Teachers deciding on an approach to a controversial topic might first consider the prior knowledge or socio-political perspectives of their students. Failure to engage in such forethought can undermine the effectiveness of instruction, as a teacher leading class in a haphazard manner may be forced to contend with unforeseen obstacles.

Humans also have a *vicarious capability* that allows them to learn not only through direct experiences but from the experiences of others. As with forethought,

learning through observation frees the individual to explore the potential consequences of a behavior without suffering the possible repercussions of that behavior. Student teachers may learn a great deal from their mentors' pedagogical successes and failures that they can later apply to their own teaching.

Humans are equipped with a *self-regulatory capability* that allows them to modify their behavior in a manner consistent with their personal standards. Self-regulation enables individuals to transform their environment rather than to be controlled by external pressures. A teacher who finds it arduous to grade a stack of term papers may set proximal goals and related incentives to ensure that the task will be completed before a deadline. For self-regulation to occur, individuals must first evaluate their past or current performance. This *self-reflective capability* serves to mediate the relationship between environmental inputs and the responses they generate. It is through reflection that individuals designate meaning to experiences and ideas. A teacher may interpret the blank stares of her students as evidence that she has not captured their interest. Another individual in the same situation may instead decide that the material is too advanced for the class. These differing conclusions will likely lead to different plans of action. That is, behavior depends not only on the experience itself but also on how one interprets that experience.

According to social cognitive theory, self-reflection that involves the appraisal of oneself has a profound influence on subsequent behavior. Bandura (1997) argued that individuals' *self-efficacy*, defined as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3), is especially central to the exercise of human agency. Self-efficacy beliefs, he maintained, are often more predictive of behavior, motivation, and affective states than are previous levels of

achievement alone. Self-efficacy has been found to predict the effort people put forth, how well they persevere when faced by obstacles, how effectively they monitor and motivate themselves, what they achieve, and the choices they make in life (Bandura, 1977, 1986, 1997).

Teaching Self-Efficacy

Teaching self-efficacy has been defined as "the teacher's belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context" (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998, p. 233). In general, self-efficacy beliefs vary according to contextual factors (Pajares, 1996). In the domain of teaching, working conditions may have an especially powerful influence on what instructors believe they can or cannot do. A teacher with a strong sense of efficacy for teaching science in an elementary school may feel quite differently about his ability to instruct a middle school social studies class. Teachers assess their capabilities by considering the demands of the task in a given context (Tschannen-Moran et al., 1998).

Researchers who have investigated the correlates of teaching self-efficacy across different instructional contexts have found that self-efficacious instructors are generally more directed, resilient, and effective in their teaching than are less confident teachers. Woolfolk Hoy and Davis (2006) suggested that teachers with a higher sense of efficacy are more likely to engage in adaptive cognitive practices. More specifically, instructors self-regulate by emphasizing factors that are within their control. As a result, teachers with higher self-efficacy attempt to improve their effort, pedagogical strategies, explanations, activities, and support for students (Woolfolk Hoy & Davis, 2006).

Highly confident instructors tend to approach the teaching task purposefully. They typically plan and organize more effectively than do their counterparts (Tschannen-Moran et al., 1998). Rather than merely covering the curriculum, self-efficacious teachers design specific instructional strategies to engage students (Ashton & Webb, 1986; Chacon, 2005). They are also more willing to learn and use new strategies and approaches (Ghaith & Yaghi, 1997; Gibson & Dembo, 1984). Continuing to improve one's teaching strategies, in turn, enhances teaching self-efficacy (Stein & Wang, 1988). Thus, the association between the use of innovative strategies and a teacher's sense of efficacy may be reciprocal. In similar fashion, instructors with stronger teaching self-efficacy are more motivated to engage in self-directed and formal professional development efforts (Mushayikwa & Luben, 2009**;** Young & Kline, 1996), and participation in such workshops improves instructors' efficacy beliefs (Chacon, 2005; Henson, 2001a).

Self-efficacious teachers put more effort into motivating their students (Chacon, 2005). They tend to approach classroom management with the goals of maximizing student autonomy, cultivating a positive environment, and ensuring that learning takes place (Woolfolk Hoy & Hoy, 1990). For example, they provide individualized help and offer students choices in their academic endeavors (Midgley, Feldlaufer, & Eccles, 1988). Self-efficacious teachers commit to high but reachable goals and model persistence in the face of obstacles (Dembo & Gibson, 1985; Woolfolk Hoy & Davis, 2006). Given the prospect of student failure, they are more likely to spend a substantial amount of time helping underperforming students (Gibson & Dembo, 1984). They are also less likely to refer students to special education and are more willing to collaborate with parents in

helping students who are falling behind (Meijer & Foster, 1988; Podell & Soodak, 1993; Soodak & Podell, 1993).

Teachers with strong efficacy beliefs are more likely to build and maintain a healthy rapport with their students. They tend to be less critical of students who provide incorrect answers (Gibson & Dembo, 1984) and more likely to adhere to a humanistic and less controlling approach to discipline (Woolfolk, Rosoff, & Hoy, 1990). Whereas instructors with lower teaching self-efficacy may ask easier questions and allow less wait time, self-efficacious teachers are more confident in answering questions and provide more thorough explanations (Woolfolk Hoy & Davis, 2006). In all, teachers with higher self-efficacy beliefs strive to create a warm and accepting classroom (Ashton & Webb, 1986). It is therefore not surprising that students are more likely to give positive evaluations to self-efficacious instructors (Young & Kline, 1996).

Teaching self-efficacy is thought to influence not only the beliefs and behaviors of the instructor but of the students as well. Woolfolk Hoy and Hoy (1990) emphasized that "researchers have found few consistent relationships between characteristics of teachers and the behavior or learning of students. Teachers' sense of efficacy . . . is an exception to this general rule" (p. 81). As previously mentioned, self-efficacious teachers set challenging proximal goals for their students and communicate them clearly (Woolfolk Hoy & Davis, 2006). In one study, students of highly confident mathematics teachers were more likely to have high expectations of themselves and to perform well in class (Midgley, Feldlaufer, & Eccles, 1989). Moreover, the pupils of less self-efficacious teachers were more likely to believe that mathematics was difficult. Allinder (1995) found that special education teachers who were confident in their capabilities set more ambitious end-of-year goals for their students. These findings suggest that instructors'

sense of efficacy influences not only the formation of proximal goals but of distal goals as well.

Teachers' beliefs in their capabilities have also been positively correlated with students' score on various standardized tests (Anderson, Greene, & Loewen, 1988; Moore & Esselman, 1992; Ross, 1992). In a longitudinal study, teaching self-efficacy was positively associated with students' final examination scores, even when previous levels of achievement were controlled (Caprara, Barbaranelli, Steca, & Malone, 2006). Given these increases in performance, it is perhaps not surprising that an association exists between teachers' and students' sense of efficacy (Anderson et al., 1998; Ross, Hogaboam-Gray, & Hannay, 2001). The influence of instructors' sense of efficacy on student beliefs, however, is stronger for lower-performing students than it is for higher-performing students (Midgley et al., 1989).

Klassen (2006) cautioned that, despite the notable benefits of high self-efficacy, an overly optimistic sense of efficacy could be counter-productive in certain situations. Wheatley (2002) suggested that doubts ultimately aid a teacher's development by (a) fostering disequilibrium and change, (b) fostering reflection, (c) supporting motivation to learn, (d) supporting responsiveness to diversity, and (e) fostering productive collaboration. In one recent study, preservice science teachers were found to be highly self-efficacious but failed to progress beyond naïve conceptions about teaching in diverse settings (Settlage, Southerland, Smith, & Ceglie, 2009). The authors attributed the participants' lack of growth to their overconfidence and argued that self-doubt may prove to be a motivating factor in teacher education.

Bandura (1982) contended that although self-doubt might motivate individuals to learn, self-efficacy "sustains the effort needed for optimal performance, which is difficult

to realize if one is beleaguered by self-doubts" (p. 123). Whereas it may be healthy for teachers to have a certain level of doubt, their confidence may serve as a more lasting motivational force. Woolfolk Hoy and Davis (2006) acknowledged that poorly calibrated teacher beliefs could potentially become problematic but maintained that responding effectively to self-doubts would require high teaching self-efficacy. Confidence can therefore serve to inhibit or enhance instructors' professional growth. Teachers with high self-efficacy may view changes in their instruction as unnecessary, but their confidence may alternatively make the prospect of change less threatening (Guskey, 1989).

Four Hypothesized Sources of Teaching Self-Efficacy

In his social cognitive theory, Bandura (1997) outlined four sources of self-efficacy: mastery experiences, vicarious experiences, verbal persuasions, and physiological and affective states.

Mastery Experiences

Interpretation of *mastery experiences*, or individuals' performances on previous tasks, is thought to be the most influential source of self-efficacy. People who view their past efforts as successes are more likely to approach similar tasks with confidence, whereas those who believe they have failed may develop less confidence in their abilities. A teacher who thinks that her first lecture bored her students might experience negative self-efficacy beliefs. A teacher who left class with a more positive impression of her teaching, however, might become more self-efficacious with regard to her instruction. Mastery experiences may be especially powerful when one succeeds on a task that is thought to be particularly demanding. Other factors, such as the need for extensive effort or overreliance on help from others, can nevertheless dampen the influence of a success

on one's confidence. That is, an accomplishment may do little to alter an individual's self-efficacy if it is attributed to something other than ability.

Vicarious Experiences

Vicarious experiences are derived from witnessing the successes and failures of others performing a task. The effect of these experiences on the development of self-efficacy may be profound when the task is relatively novel. Vicarious experiences are also particularly potent when the model or comparison group is perceived as similar to the individual. When social comparison involves a similar model, the model's failure is more likely to lower one's self-efficacy, whereas a vicarious triumph may raise the observer's self-efficacy. Observing others who excel in a field can also result in self-efficacy-building experiences. For example, student teachers who closely monitor the teaching of a mentor may become more confident in their ability to employ the modeled instructional strategies. Models who openly struggle to overcome obstacles (called coping models) are more likely to enhance an observer's self-efficacy than are those less likely to acknowledge their mistakes (known as mastery models) (Schunk, 1983, 1987; Schunk & Hanson, 1985, 1988).

Vicarious experiences can also take the form of referential comparisons in which one's assessment of a performance is mediated by perceptions of others' performances. Teachers who judge their instruction as inferior to their colleagues' may feel less self-efficacious as a result. Those who compare themselves favorably with others at their school, however, may become more confident as teachers.

Social Persuasions

Evaluative feedback in the form of *social persuasions* can also influence teachers' self-efficacy. As with vicarious and mastery experiences, such messages are particularly

powerful when an individual has little experience in a domain. The power of social persuasions to change one's self-efficacy is often mediated by the perceived knowledge or credibility of the person providing the feedback. For example, the feedback an instructor receives from someone who has only observed her classroom once will likely inform her self-beliefs to a lesser degree than will the verbal persuasions of someone who supervises her on a more frequent basis (Morris, 2009). The effectiveness of praise depends not only on who delivers it but also on the way that a message is framed. Encouragements that are little more than "knee-jerk praise or empty inspirational homilies" are unlikely to influence an individual's confidence (Pajares, 2006, p. 349). Messages that are specific and sincere can have a powerful effect on the development of one's self-efficacy (Schunk, 1984; and see Hattie & Timperley, 2007). Discouraging messages may be more effective in altering self-beliefs than are positive social persuasions (Bandura, 1997).

Physiological and Affective States

Finally, *physiological and affective states* including stress, fatigue, anxiety, and mood may also inform one's self-efficacy. A teacher who experiences extreme anxiety just before entering his classroom may construe the somatic information as a sign that he is not well prepared. Intensity of these states may also influence one's interpretation. Bandura (1997) maintained that moderate levels of arousal lead to optimal performance, a contention supported by various empirical findings (Cassady & Johnson, 2002; Keeley, Zayac, & Correia, 2008; Yerkes & Dodson, 1908). Perceived arousal may often be related to perceived efficacy in a similarly curvilinear manner (Bandura, 1997). Teachers who enter a classroom with a low level of arousal may interpret their feelings as a sign that their efforts are futile. Those who believe that a moderate degree of anxiety is

indicative of their excitement for the subject, however, may lead an enthusiastic class discussion.

The hypothesized sources do not affect one's self-efficacy directly but are instead mediated by individuals' interpretation of their experiences. Being recognized as "teacher of the year" may make some teachers more confident in their capabilities. However, those who feel that such an award was underserved may not experience any change in their self-beliefs. Attributional interpretations can furthermore determine the strength of the association between a source and one's self-efficacy. An instructor who believes that his students are lazy may be less affected by their failure than would one with higher opinions of his students' work ethic.

The impact of a single event on one's confidence may be particularly intense when the task is relatively novel. Novice teachers may be especially moved by others' praise because they have so few other experiences with which to judge their competence. Individuals' cognitive processes also influence how they weigh multiple sources of capability-related information. For example, teachers may feel more self-efficacious as they receive more social persuasions. Alternatively, teachers may place more value on certain types of persuasions and be less affected by others. How individuals construe their experiences plays an essential role in the development of their confidence. Indeed, Bandura (1997) emphasized that capability-related information is made relevant to self-efficacy only through interpretive processes.

Drawing from Bandura's (1997) description of the sources of self-efficacy, Tschannen-Moran et al. (1998) provided some suggestions as to how teachers might develop confidence in their pedagogical abilities. They hypothesized that teachers' interpretations of their own teaching experiences and their related physiological states

would provide the most ability-related information. They also contended that various social models, such as other teachers, media images, and examples from literature, might inform teachers' self-efficacy. Although Tschannen-Moran et al. noted that instructors may receive social persuasions during their coursework or professional development workshops, they suggested that evaluations by supervisors, other teachers, or students could provide the most powerful positive feedback. They furthermore proposed that the relationship between teaching self-efficacy and its sources is cyclical (see Figure 1): The sources are hypothesized to influence confidence, which in turn affects the quality of an instructional performance. The success or failure of a given performance results in new ability-related information.

This cyclical process has been described by others as well. For example, Burton et al. (2005) suggested that instructors who receive encouraging student evaluations (social persuasions) may subsequently feel more confident in their capabilities. As a result, they put more effort into planning their discussions, leading to their improved instruction and more positive feedback (social persuasions). Negative experiences, on the other hand, may perpetuate teachers' lack of confidence. For this reason, the hypothesized sources may be particularly potent when the task of teaching is new and the individual has yet to develop a stable sense of competence (Bandura, 1997).

Research on the Sources of Teaching Self-Efficacy

In this section, I present the findings of scholars who have explored the sources of teaching self-efficacy. I begin with a brief overview of research in this domain. Next, I describe how various sources of teaching self-efficacy have been measured both quantitatively and qualitatively. I then detail the results of these studies as they apply to each of the hypothesized sources.

I used several search approaches to identify literature related to the sources of teaching self-efficacy. First, I searched online databases (i.e., Web of Science, PsycINFO, ProQuest) to search for relevant articles and dissertations. I truncated search terms using asterisks to increase the number of pertinent results. These terms included "teach*" and "efficac*." I often included the term "source*," "antecedent*," "origin*," "mastery," "vicarious," "persuasion*," or "state*." I also conducted a Google search for these terms. Finally, I combed relevant articles, dissertations, and books for references to other related studies. Although my primary interest was in research that explicitly addressed the hypothesized sources, I also reviewed literature that emphasized the relationship of teachers' self-efficacy to their experiences, emotions, or physiological states.

Overview of Research on the Hypothesized Sources

Few scholars have investigated the sources of teaching self-efficacy, and research in the area has been uneven. The goals that have driven studies of the hypothesized sources have varied greatly. Whereas many investigations have been exploratory in nature, others have been designed for the purpose of scale construction or teacher professional development. Due in part to the inconsistency of these approaches, a clear profile of the sources of teaching self-efficacy has yet to emerge. A summary of findings from these investigations is presented in Table 1. I have elected to keep the authors' terminology in reference to the sources of self-efficacy as they were in the original studies, but as I explain in the next section, the actual measures used to assess these sources of self-efficacy varied widely across studies, as did those used to assess teaching self-efficacy, which included Gibson and Dembo's (1984) Teacher Efficacy Scale (TES), Enochs and Rigg's (1990) Science Teaching Efficacy Belief Instrument Form B (STEBI

B), Tschannen-Moran and Woolfolk Hoy's (2001) Teachers' Sense of Efficacy Scale (TSES) and Bandura's (2006) Teacher Self-Efficacy Scale (TSES).

Measures of the Four Sources of Teaching Self-Efficacy

In this section, I address the diverse ways in which the sources of teaching self-efficacy have been measured. In some cases, I point out the ways in which the measures used have provided only limited information relevant to a given source. In other cases, I identify measures that are inconsistent with the tenets of social cognitive theory. Of the 15 studies to explicitly address the hypothesized sources, nine have been quantitative, three have been qualitative, and three have employed mixed methods. These studies have differed with regard to their purpose, whether for scale development (e.g., Poulou, 2007), creation of a professional development program (e.g., Palmer, 2006b), or exploration of important events in instructors' lives (e.g., Morris, 2009).

The hypothesized sources have also been operationalized differently across studies. In some studies, researchers have measured a given source of self-efficacy using a single item (Heppner, 1994; Palmer, 2006b, Tschannen-Moran & Woolfolk-Hoy, 2007). Researchers in three studies have employed multiple-item scales that assessed all four hypothesized sources (Keiffer & Henson, 2000; Poulou, 2007; Weaver Shearn, 2008). Finally, in three other studies, researchers have focused one or two of the hypothesized sources and assessed them using multiple items (Capa Aydin & Woolfolk Hoy, 2005; Tschanen-Moran & Woolfolk Hoy, 2007; Woolfolk Hoy & Burke Spero, 2006).

I begin each subsection below by describing quantitative measures used to assess each hypothesized source, as those are of greatest interest in the present study. I then briefly describe the measures used. Finally, I evaluate the merits of scales developed for

the assessment of all four hypothesized sources. A list of sample quantitative and qualitative items used in the assessment of the hypothesized sources can be found in Table 2.

Measures Used to Assess Mastery Experience. Mastery experience is difficult to define in the context of teaching due to the complexities inherent in the instructional task. Competency, or efficacy, in teaching involves the mastery of several different skills. Success or failure can therefore be inferred from a variety of indexes. As they evaluate their capabilities, teachers may look to indicators as diverse as students' performance, students' on-task behaviors, and teaching recognition. As a result, the manner in which mastery experience has been assessed has varied considerably.

Some researchers have used teachers' direct experiences (e.g., actual vs. simulated instructional experiences) as a proxy for mastery experience (Cantrell, Young, & Moore, 2003; Capa Aydin & Woolfolk Hoy, 2005; Gurvitch & Metzler, 2009). Such measures have been directly observed, however, and have not reflected teachers' own appraisals of their past teaching experiences. Without evaluating teachers' interpretations of their experiences, little can be known about whether the experiences were perceived as efficacy-raising or lowering events (Bandura, 1997). Capa Aydin and Woolfolk Hoy (2005) acknowledged this limitation and suggested that student teachers whose early experiences were negative may have felt less capable as a result.

Other researchers have assessed teachers' appraisals of their experiences. One such approach has been to explore participants' perceptions of their successful teaching experiences. For example, in one study, teachers were asked to rate their degree of success in "teaching sessions during teaching practice" (Poulou, 2007, p. 197). Some investigators have asked teachers to rate their level of satisfaction with their professional

performance (Poulou, 2007; Tschannen-Moran & Woolfolk Hoy, 2007; Weaver Shearn, 2008; Woolfolk Hoy & Burke-Spero, 2005).

Although informative, such items may not be best suited to represent a mastery experience as defined by Bandura (1997) because the term "satisfaction" is not necessarily equivalent to perceived mastery. The teachers who endorsed such items could have believed that their instruction had been satisfactory due to positive feedback they have received (verbal persuasions) or due to their relative superiority to other teachers (vicarious experience). Furthermore, the phrase "professional performance" is not domain specific. Instructors forced to teach outside of their content area for a year could report being unsatisfied but believe themselves to be highly capable in their own area.

Researchers who have measured mastery experience qualitatively have typically asked general questions to elicit a variety of responses related to the source. In Mulholland and Wallace's (2001) case study, initial protocol questions were not specifically designed to assess the sources. Rather, the theoretical framework was designated following data analysis and used to frame their findings (J. Mulholland, personal communication, October 19, 2009). In a previous study, I assessed mastery experiences more directly by asking award-winning professors what experiences in their professional lives as teachers had made them more and less confident (Morris, 2009). To evaluate the daily influence of mastery experiences, I prompted participants to reveal how they knew a given lesson had or had not gone well. Milner and Woolfolk Hoy (2003) also explored mastery experiences in their case study using semi-structured interviews, but their protocol is unavailable (e.g., R. Milner, personal communication, October 19, 2009).

Other researchers have assessed mastery experience by asking general questions about the events contributing to participants' teaching self-efficacy and then categorizing those sources according to Bandura's (1997) tenets. For example, Heppner (1994) asked graduate instructors "what experiences during the semester had most impact on their self-efficacy beliefs" (p. 503). The responses generated were categorized into the four sources by two raters. The potential downfall of such a method is that instructors are cued to think of their "experiences" and may overlook the subtle influence of vicarious experiences and physiological and emotional states. In his informal surveys of preservice teachers in a science methods course, Palmer (2006b) used prompts more open to interpretation (e.g., "Was there anything in today's workshop that helped to make you more confident to teach science?", p. 343). Palmer defined his mastery experiences category as "successful experience teaching a child" (p. 345). Although coding mastery experiences in this way served the purposes of Palmer's (2006b) study, there are other facets of mastery experiences beyond successful, or even unsuccessful, experiences teaching children. For example, mastery of the content and receipt of teaching awards can enhance teaching self-efficacy, but they do not fit into this definition.

Measures Used to Assess Vicarious Experience. In general, vicarious experiences have proven difficult to measure and their relative influence on self-efficacy is still unclear (Usher & Pajares, 2008). The influence of vicarious experience on teachers' self-efficacy may be subtle, even to the participants. For example, teachers might not readily consider the impact of overhearing other instructors express their self-doubts in the workroom (Mulholland & Wallace, 2001). Many preservice teachers also engage in the self-modeling practice of filming themselves while teaching, but no study has explicitly addressed how watching these videos enhances self-efficacy. Individuals

might also underestimate the importance of these experiences because their influence tends to be ongoing rather than episodic. For example, when recalling events that influenced their self-efficacy, teachers may overlook the importance of the frequent comparisons they make of themselves to others and focus on a single episode instead.

Although social models of teaching abound during one's own learning experiences and in the media, some teachers-in-training have had relatively few opportunities to observe practicing teachers whose experiences might be most informative (Bandura, 1997; Mulholland & Wallace, 2001). It is perhaps for this reason that few researchers have assessed the referential comparisons teachers make. Poulou (2007) asked that preservice teachers rate their own teaching in comparison "with that of their colleagues" (p. 198). It may be important for researchers to clarify what is meant by "colleagues." In this case, simply replacing the term "colleagues" with "other preservice teachers" may make the item less ambiguous. Woolfolk Hoy and Burke-Spero (2005) assessed vicarious experience by asking first-year teachers to rate "their own success during the first year compared to other first-year teachers in similar situation" (p. 350). They considered this item to be a measure of teachers' mastery experience rather than vicarious experience, however. Although the item does indeed include elements of mastery experience, it emphasizes a social comparison and is therefore also a vicarious experience.

Some quantitative measures have addressed vicarious experiences associated with teaching mentors or models. Capa Aydin and Woolfolk Hoy (2005) assessed preservice students' vicarious experiences as perceptions of their mentor teacher's effectiveness. Participants were asked to rate how effective their mentors were according to seven different characteristics (e.g., "demonstrate effective classroom management practices,"

"have a thorough command of curriculum being taught," p. 124). A similar item was used by Poulou (2007) to measure the social comparisons preservice teachers made with their teaching mentors (p. 198).

Only two qualitative studies have explicitly addressed vicarious experiences. In one of these, I asked professors to pinpoint vicarious influences on their teaching self-efficacy, and offered as examples things they may have read or seen, or others they may have observed (Morris, 2009). However, offering examples of vicarious experience may bias participants to report certain types of experiences and underreport others. For example, participants were not asked to consider the influence of self-modeling, which is one aspect of vicarious experience described by Bandura (1997). Other researchers have, on the hand, assessed vicarious experience as cognitive self-modeling by asking the preservice teachers in his study to imagine themselves teaching (Palmer, 2006b),. Cognitive self-modeling may serve as an important vicarious experience often overlooked by researchers.

Measures Used to Assess Social Persuasions. The social messages that teachers receive come in a variety of forms. They can vary with regard to the source of the persuasion (e.g., administrator, colleague, parent, student) or the form persuasion takes (e.g., verbal comments, letters, awards). Social persuasions may also be conveyed subtly, as when teachers are asked by peers for advice related to instruction, or when students display negative body language. Moreover, teachers' mastery experiences are often related to the persuasions they receive (Morris, 2009). It is therefore no small task to measure the social persuasions teachers receive in a comprehensive manner.

Researchers have often measured social persuasions as teachers' perceptions of the support they have received. For example, Capa Aydin and Woolfolk Hoy (2005)

designed a 5-point scale to assess "the quality of support" (p. 125) preservice teachers had received from students, school community, and university supervisors. Other researchers have followed suit, measuring social persuasions in nearly identical ways (Weaver Shearn, 2008; Tschannen-Moran & Woolfolk Hoy, 2007). Although the term "support" is broad enough to include a variety of persuasions, it may also be too broad to measure social persuasions in a manner consistent with Bandura's (1997) tenets. For example, teachers may feel well-supported by parents because they receive gift certificates from the Parent Teacher Association or see that parents volunteer to chaperone field trips. However, these experiences may convey little information regarding the teachers' capabilities.

Other items used to measure social persuasions have been either too narrow or too broad to adequately capture Bandura's (1997) characterization of the source. For example, Heppner (1994) used a single item to assess social persuasions, "significant people in the graduate student instructor's life persuading him or her about his skillfulness as a teacher" (p. 502). Such an item is consistent with Bandura's (1997) descriptions, but does not allow for other possible facets of social persuasion (e.g., awards received, student evaluations). Weaver Shearn (2008), on the other hand, assessed social persuasions as the benefit teachers receive from collaboration with campus colleagues. Although participants reading the item may indeed consider the encouragements of their colleagues, they might also be likely to reflect on their vicarious experiences. A better measure of social persuasions might take the form of more narrowly written items that as a whole represent the range of persuasions described by Bandura (1997).

In my previous study, I qualitatively assessed social persuasions by first asking participants what others had told them about their teaching (Morris, 2009). I then explored what messages had boosted and decreased participants' confidence. Palmer (2006b) categorized social persuasions as feedback that the participants' teaching was successful. Such a definition does not take into account the social discouragements that individuals may have received.

Measures Used to Assess Physiological and Affective States. How individuals feel before, during, and after teaching a class may affect their self-beliefs on a daily basis and may also have implications for their overall perceptions of efficacy. As with vicarious experiences, the influence of physiological and affective states on self-efficacy may be ongoing rather than episodic and may thus be less accessible in participants' memory. Perhaps due to the difficulties inherent in measuring physiological arousal and emotions, research on the four hypothesized sources has often neglected the influence of physiological and affective states.

The only quantitative studies to address physiological and affective states have been those designed to assess all four hypothesized sources. In Heppner's (1994) scale, the source was measured by a single, general item. Graduate instructors were asked to rate the degree to which their self-efficacy was influenced by "information the graduate student instructor obtains from his or her body that might include nervousness, tension, or calm while teaching" (p. 502). Such an item is consistent with Bandura's (1997) description of physiological states, but like items in many other studies, it does not address the influence of emotions. Other items have been used to assess the mere existence of a physiological state (e.g., "The idea of being in a classroom as a teacher makes me nervous," Keiffer & Henson, 2000, p. 16; "[I have] feelings of stress or anxiety

during [my] teaching sessions," Poulou, 2007, p. 198). As Bandura (1997) noted, however, a given physiological or affective state can be interpreted in multiple ways, with differential effects on individuals' self-efficacy. Identifying a physiological state as "nervousness" requires some interpretation on the participant's part, but equally important is how the participant construes somatic information after giving it a name. For example, award-winning professors considered nervousness before a class to be normative, and it thus had little or even an enhancing influence on their teaching self-efficacy (Morris, 2009). Construal is therefore important in designing a physiological or affective state item, as when Poulou (2007) asked preservice teachers to rate "feelings of fatigue following [their] teaching sessions as an indication of lack of ability or disappointment" (p. 198).

Physiological and affective states have been evaluated qualitatively by asking participants to identify prominent feelings and emotions they experienced while teaching or preparing to teach that raised or decreased their confidence as instructors (Morris, 2009). However, the prompt used in this study did not take into account the import of physiological and affective states that one experiences after completion of a teaching exercise. Palmer (2006b) characterized preservice teachers' self-efficacy-building events as physiological states when those events involved "coping with stress, fear, and anxiety" (p. 345). As with other studies, Palmer (2006b) does not address the influence of positive emotions and states. In general, physiological and affective states have been measured in narrow ways, and many facets of the source (e.g., emotions) have received little attention. Furthermore, more work is needed to determine the ways that somatic information is construed.

Sources of Teaching Self-Efficacy Scales. To date, only four scales have been developed to assess all four sources hypothesized by Bandura (1997). The first of these scales was created by Heppner (1994) to evaluate the influence of a teaching practicum on graduate instructors' self-efficacy. As noted above, each hypothesized source was assessed using a single item, and thus the sources were too narrowly operationalized. Furthermore, only five students participated in the study, and no evidence of the scale's reliability or validity was provided

Keiffer and Henson (2000) constructed a scale of the hypothesized sources in which each source was assessed using seven to ten items. Although the scale was created for use by teachers, the 252 participants in the study were preservice teachers who were not yet certified to teach. Using such a sample to develop a scale may be problematic because teachers attend differently to the sources at different stages (Tschannen-Moran & Woolfolk Hoy, 2007). Ultimately, the authors presented their finding as only preliminary, because the subscales did not cluster as expected in exploratory factor analysis. Their study was presented at a conference but has not been published.

Poulou (2007) created a 30-item scale to assess the sources of teaching self-efficacy among preservice teachers in Greece. Items designed to assess mastery experiences and social persuasions were combined into a single subscale entitled "enactive mastery with social/verbal persuasion" (p. 197). Combining items representing different sources in this manner may ultimately undermine the utility of the scale; as Usher and Pajares (2008) put forth, "results from studies that have used an aggregate score from two or more sources yield little practical information, as combining sources prevents an understanding of how [individuals] interpret each source independently" (p. 762).

Finally, in a recent unpublished dissertation study, Weaver Shearn (2008) developed a 12-item scale to assess the hypothesized sources of teaching self-efficacy among a sample of first-year teachers. However, many of the items used were conceptually inconsistent with Bandura's (1997) postulates. For example, "Rate the interpersonal support provided to you by campus colleagues" (p. 96) was used to assess social persuasions, whereas, "Rate the interpersonal support provided to you by district personnel" (p. 96) was used to assess mastery experience. Decisions to associate an item with a given source appear to have been informed by empirical (i.e., factor analysis), not theoretical, considerations. A factor-analytic approach to scale development, although data-driven, should always take into consideration the consistency of findings with the underlying theory (Thompson, 2004).

Summary. Measurement of the sources of teaching self-efficacy has been inconsistent. In many cases, the hypothesized sources have been assessed in narrow and conceptually problematic ways. Only four scales have been developed that measure all four sources hypothesized by Bandura (1997), and each of these scales is limited in important ways. A more inclusive scale that is conceptually and psychometrically sound could be used to advance understandings of the hypothesized sources. If consistently adopted, it could help researchers generalize results across various studies. Such a scale, however, does not yet exist. As a result, findings on the sources of teaching self-efficacy tend to be isolated and equivocal.

Validity of measures. As previously discussed, the validity of sources of self-efficacy measures (i.e., the extent to which scales designed to assess the hypothesized sources of self-efficacy accurately measure those sources) is often undermined by items that are written too narrowly, too broadly, or in ways inconsistent with Bandura's (1997)

tenets. The validity of a multiple-item scale that addresses all four hypothesized sources can also be examined using factor analysis, although only two researchers have attempted such analysis (i.e., Poulou, 2007; Weaver Shearn, 2008). Another way to establish evidence of scale validity is by examining the relationship of the hypothesized sources to teaching self-efficacy using correlation and regression analyses. That is, if scales of the sources are indeed valid, they should be associated with individuals' self-efficacy beliefs. However, the measurement of teaching self-efficacy itself has been inconsistent, which has further confounded researchers' understandings of the relationship between the hypothesized sources and self-efficacy. Woolfolk Hoy and Burke-Spero (2005) reported that the significance of correlations between hypothesized sources and change in teaching self-efficacy varied as a function of the scale used.

Research Findings on the Sources of Teaching Self-Efficacy

In the two preceding sections, I described some of the limitations of measures used to assess the sources of teaching self-efficacy. I next describe key findings from studies of the hypothesized sources and offer my own assessment of why these findings should be viewed as preliminary. Where appropriate, I also incorporate results from studies that did not explicitly address the hypothesized sources but may nonetheless be pertinent to continued research in this area.

In only three quantitative studies of the four sources have researchers investigated the relationship of these sources to teaching self-efficacy using regression analysis (Capa Aydin & Woolfolk Hoy, 2005; Poulou, 2007; Weaver Shearn, 2008). More often, such investigations present the relationships between sources and self-efficacy in the form of bivariate correlations. Scholars who have used qualitative methods, on the other hand,

generally report more specific experiences (e.g., observing negative student body language) that serve as sources of teaching self-efficacy.

Researchers who have studied all four hypothesized sources of self-efficacy typically find that mastery experiences are one of the most potent sources of instructors' self-efficacy beliefs, whether in a K-12 or university context (Heppner, 1994; Morris, 2009; Poulou, 2007; Weaver Shearn, 2008). Correlations between teachers' self-efficacy and their satisfaction with their professional performance have ranged from .36 to .50 (Tschannen-Moran & Woolfolk Hoy, 2007; Weaver Shearn, 2008; Woolfolk Hoy & Burke-Spero, 2005). As previously discussed, it may be problematic to operationalize mastery experience in terms of satisfaction with professional performance. Regardless, these correlations are relatively high, and researchers may consider refining such an item and reassessing it in subsequent studies.

Some informative experiences may have less to do with classroom performances than with the mastery of content and skills related to instruction. Instructors have indicated, for example, that their attainment of a high degree (Milner & Woolfolk Hoy, 2003) the training they received at their university (Cheung, 2008), or the completion of several courses in their field (Enochs, Scharmann, & Riggs, 1995) have enhanced their teaching self-efficacy. A study of university teachers revealed that those who had taken more pedagogical courses were subsequently more confident (Postareff, Lindblom-Ylanne, & Nevgi, 2008). Palmer (2006a) similarly found that preservice science teachers reported that learning how to teach their subject matter functioned as a powerful source of self-efficacy. In my previous study, I found that university instructors also considered their mastery of subject matter when evaluating their capabilities (Morris, 2009). Chacon (2005) likewise reported that courses that enhanced foreign language teachers' fluency in

the language of instruction enhanced their teaching self-efficacy. It thus appears that knowing the material, and knowing how to teach it well, provide instructors with a positive sense of efficacy.

Perceptions of student achievement have also been found to influence instructors' confidence (Guskey, 1987), but research on the sources of teaching self-efficacy has largely overlooked this form of mastery experience. I found that professors' perceptions of capability were connected to the educational and occupational attainments of their students (Morris, 2009). Mastery experience may therefore be informed not only by teachers' own attainment, but by the attainments of their students as well.

Bandura (1997) has shown that individuals rely not only on their direct experiences as indicators of what they can do but also on the vicarious experiences they undergo as they observe the actions of models. Individuals' referential comparisons are thought to be sources of their efficacy beliefs. Woolfolk Hoy and Burke-Spero (2005), however, found that teachers' ratings of their success in comparison to that of their peers did not significantly correlate with their perceived efficacy.

Perceptions of the effectiveness of a teaching mentor were not significantly related to preservice teachers' self-efficacy (Capa Aydin & Woolfolk Hoy, 2005). Similarly, no relationship was found between student-teachers' self-efficacy and their ratings of mentors as coaches, information sources, or evaluators (Rots, Aelterman, Vlerick, & Vermuelen, 2007). However, students who perceived their mentors to be highly self-efficacious were themselves more confident after completing their student teaching (Knoblauch & Hoy, 2008). Furthermore, instructors in another study claimed that early experiences with masterful mentors were foundational in the development of their confidence because the experiences armed them with pedagogical strategies

(Morris, 2009). In general, however, the influence of vicarious experiences on teaching self-efficacy remains elusive.

Scholars who have investigated the relationship between social persuasions and teaching self-efficacy have typically found that the evaluative messages instructors receive do affect their perceived capability, and, as noted above, the measures used to assess this source have differed markedly. In a mixed methods study of graduate teaching assistants engaged in a teaching practicum, Heppner (1994) found that social persuasions were the most commonly cited source of self-efficacy and were rated as highly influential.

Assessing social persuasions in terms of perceived support from the community, administration, colleagues, or parents has produced mixed results. Capa Aydin and Woolfolk Hoy (2005) found that perceived support was moderately correlated ($r = .43$, $p < .01$) with teaching self-efficacy and made a unique contribution in a regression model that included variables for "relationship with mentor" and "hours of field experience" (p. 125). Tschannen-Moran and Woolfolk Hoy (2007) found perceived support to be unrelated to teaching self-efficacy among novice teachers and only weakly related among practicing teachers. Weaver Shearn (2008) reported that the statistical relationship between perceived support and self-efficacy varied greatly according to the source of the support. For example, interpersonal support provided by campus administrators was highly correlated with teaching self-efficacy, $r = .43$, $p < .01$. The relationship between interpersonal support provided by an assigned mentor and self-efficacy, however, was reported as nonsignificant at an alpha level of .05, $r = .07$. Although such data should be viewed as preliminary for reasons previously addressed, it seems logical to deduce that

the influence of a social persuasion varies as a function of the source of that persuasion and the extent to which the teaching task is still novel.

The few investigators who have assessed the direct influence of physiological and affective states on teaching self-efficacy generally report that they provide little ability-related information. Mulholland and Wallace (2001) conducted a case study of a novice teacher and concluded that physiological and affective states were less important than other sources in the development of the teacher's confidence. Similarly, Poulou (2007) found that feelings of stress, anxiety, and fatigue were correlated with teaching self-efficacy but had less influence than other sources of self-efficacy. A professional development program designed by Ross and Bruce (2007) to minimize teachers' stress and anxiety enhanced teachers' confidence to manage their classes, but it had no significant effect on their confidence to motivate students or to employ instructional strategies. Because the program was designed to enhance all four sources, however, it is impossible to determine the independent influence of physiological and affective states on subsequent self-efficacy beliefs.

Bandura (1991) has demonstrated that self-regulation and self-efficacy are related constructs, and there is some evidence that teachers who are able to regulate their physiological and affective states are more confident as a result. Sutton and her colleagues (Sutton, 2006; Sutton, Mudrey-Camino, & Knight, 2009) have documented that teachers who engaged in emotional regulation believed they were more effective in managing their classrooms and interacting with students. I found that award-winning professors regulated their physiological and affective states in a variety of ways to enhance their sense of efficacy (Morris, 2009). Many blocked out negative emotions before entering a classroom, and some mentioned that actions as simple as eating a full

meal or dressing professionally helped them to feel more confident. Such self-regulation, however, requires that teachers are aware of their emotions. Indeed, self-efficacious teachers are typically higher in intrapersonal emotional intelligence than are their less confident colleagues (Di Fabio & Palazzeschi, 2008).

Relatively few efforts have been made to systematically test the influence of Bandura's (1997) four hypothesized sources on the self-efficacy beliefs of teachers at any level, and those who have investigated the sources have used quite different methods, measures, and samples in doing so. As a result, there is no clear understanding of the events that lead teachers to believe in, or to doubt, their capabilities. Stronger scales of the sources of teaching self-efficacy are necessary to provide a more complete picture of the hypothesized sources and their influence on teachers' self-efficacy.

Related Teacher Motivation Variables

In this section, I provide an overview of several variables that have also been found to correlate with individuals' self-efficacy. I begin with a general overview of each construct and then discuss its relationship with teaching self-efficacy and its sources. I next review three variables that have received increasing attention in the teaching self-efficacy literature: teacher satisfaction, teacher stress, and collective teacher efficacy. I then introduce three constructs that have been studied extensively by positive psychologists: optimism, authenticity, and invitations (Seligman & Csikszentmihalyi, 2000). Positive psychology focuses on the "conditions and processes that contribute to the flourishing or optimal function of people, groups, and institutions" (Gable & Haidt, 2005, p. 103). Within education, positive psychologists have investigated the antecedents of academic success, resourcefulness, and resilience by studying the self-beliefs of students who exhibit these qualities (Pajares, 2009). The relationship between these

variables and teachers' self-efficacy has received less empirical attention. In this study, I investigate the relationship among these teacher motivation variables, teaching self-efficacy and its sources.

Teacher Satisfaction

In general, individuals' satisfaction with their jobs has been found to relate to their performance at work (Judge, Thoresen, Bono, & Patten, 2001). In the domain of teaching, occupational satisfaction is negatively associated with psychological distress, teaching stress, and low self-esteem (Ho & Au, 2006; Stempien & Loeb, 2002). Moreover, teachers satisfied with their workplace and choice of occupation are more likely to continue teaching and less likely to experience burnout (Chen, 2007; Grayson & Alvarez, 2008; Skaalvik & Skaalvik, 2009; Stockard & Lehman, 2004). In addition, they tend to volunteer for duties beyond their teaching responsibilities (Somech & Drach-Zahavy, 2000). Such teachers are more likely to express mastery goals and to perceive an internal locus of control (Leugn, Siu, & Spector, 2000; Papaioannou & Christodoulidis, 2007). Teachers' satisfaction has also been linked to their sense of efficacy (Caprara, Barbarenelli, Borgogni, & Steca, 2003; Caprara, Barbaranelli, Steca, & Malone, 2006). Klassen et al. (2009) reported that, across several nations, teacher satisfaction was consistently positively associated with teaching self-efficacy. The authors cautioned, however, that the relationship between self-efficacy and satisfaction may be bidirectional.

Teachers' occupational satisfaction has been found to vary according to race, gender, and experience. Liu and Ramsey (2008) found that White teachers had higher levels of satisfaction than did teachers of other racial backgrounds but attributed these differences to work conditions and compensation. In another study, female elementary

teachers were more likely than their male colleagues to report a high level of satisfaction (Hawe, Tuck, Manthei, Adair, & Moore, 2000). Some have found that teaching experience and satisfaction are positively related (Liu & Ramsey, 2008); others have reported a negative relationship (Gursel, Sunbul, & Sari, 2002). If mastery experience is indeed related to feelings of professional satisfaction (Woolfolk Hoy & Burke-Spero, 2005), one might expect that these variables would be positively correlated.

Teacher Stress

Teachers' degree of stress has been found to predict their occupational satisfaction and performance (Cunningham, 1983; Smilansky, 1984). Those who contend with severe stress at work are less likely to be committed to teaching and more likely to experience burnout (Betoret, 2009; Jepson & Forrest, 2006). Several factors have been posited to influence teacher stress, including students, other faculty, the curriculum, additional duties, and workload (Jin, Yeung, Tang, & Low, 2008). Of these factors, researchers have focused most extensively on teachers' relationships with and management of students. Such research has documented that student misbehavior, lack of effort, and negative relationships with the teacher contribute to occupational stress (Clunies-Ross, Little, & Kienhuis, 2008; Geving, 2007; Yoon, 2002). Greene, Beszterczey, Katzenstein, Park, and Goring (2002) found that students with ADHD were rated as more stressful to teach than their classmates, particularly if they expressed oppositional behaviors.

Bandura (1997) has posited that occupational stress undermines individuals' self-efficacy. Indeed, Yu, Lin, and Hsu (2009) found that employees in Taiwanese companies who experienced many stressors tended to have lower occupational self-efficacy and thus higher levels of burnout. Researchers have noted negative correlations between stress

and teaching self-efficacy, particularly with regard to teachers' use of instructional strategies and classroom management (Betoret, Fernando, & Domenech, 2009; Yoon, 2002). Moreover, teachers who exhibit physical manifestations of stress (e.g., elevated heart rate) tend to report lower self-efficacy (Schwerdtfeger, Konermann, & Schonhofen, 2008). Thus, the literature supports Bandura's (1997) central contention that adopting a healthy appraisal of one's capabilities enhances psychological well-being. Because stress is a physiological state but is not inclusive of all facets of the hypothesized source, it would likely be highly related to physiological and affective states, particularly to items that specifically assess stress. However, items used to assess occupational stress differ from those used to measure physiological and affective states, as the former is characterized by the event itself and the latter explores the interpretation of that event.

Collective Teacher Efficacy

Collective teacher efficacy is defined as "the perceptions of teachers in a school that the efforts of the faculty as a whole will have a positive effect on students" (Goddard, Hoy, & Woolfolk Hoy, 2000, p. 480). Goddard and Goddard (2001) found that teachers' sense of collective efficacy explained some of the variation in student achievement from one school the next. Similarly, Knoblauch and Woolfolk Hoy (2007) posited that differences in student achievement could account for the lower collective efficacy of teachers in urban, rather than rural or suburban, schools. That is, mastery experiences could be shared by a group, thus influencing individuals' perceptions of group's capabilities.

Researchers have documented a positive, and perhaps reciprocal, relationship between collective teacher efficacy and teaching self-efficacy (Ciani, Summers, & Easter, 2008; Goddard & Goddard, 2001; Skaalvak & Skaalvak, 2007). One possible

explanation for the association is that schools high in collective teacher efficacy are more likely to set challenging goals, leading to increased student motivation and achievement, which in turn boosts teachers' self-efficacy (Skaalvik & Skaalvik, 2007). Whether perceptions of other teachers as successful raises or lowers one's own self-efficacy is uncertain. Skaalvik and Skaalvik (2007) hypothesized that social comparison with successful teachers may actually lower teachers' beliefs in their own capabilities. Although Bandura (1997) acknowledged that such vicarious experiences were possible, he maintained that seeing others succeed could also convince individuals that they too possessed the tools to succeed.

Optimism

Optimism can be characterized as a positive attitude related to one's expectations for the future (Pajares, 2001; Peterson, 2000). This construct has been studied extensively in social and personality psychology, where it has been associated with such phenomena as coping, stress, and depression (see Andersson, 1996, for a review). Psychologists who have studied optimism in educational settings have found that it is associated with several adaptive beliefs and behaviors. Student optimism has been associated with high levels of achievement, more commitment to goals, more persistence in the face of obstacles, and less academic stress (e.g., El-Anzi, 2005; Huan, Yeo, Ang, & Chong, 2006; Montgomery, Haemmerlie, & Ray, 2003; Rand, 2009). However, some researchers have documented that over-optimism may be as maladaptive as low optimism, leading students to problematic attributions and lower academic achievement (Haynes, Ruthig, Perry, Stupnisky, & Hall, 2006).

Pajares (2001) found that optimism was associated with students' self-efficacy as well as their self-efficacy for self-regulation. In a subsequent study, Usher and Pajares

(2009) reported that students' optimism was positively associated with four scales of mathematics self-efficacy, as well as all four hypothesized sources. Woolfolk Hoy, Hoy, and Kurz (2008) tested properties of teachers' academic optimism, which they defined as

> a teacher's positive belief that he or she can make a difference in the academic performance of students by emphasizing academics and learning, by trusting parents and students to cooperate in the process, and by believing in his or her own capacity to overcome difficulties and react to failure with resilience and perserverance. (p. 822)

The researchers measured academic optimism as a combination of teachers' self-efficacy, academic emphasis, and trust in students and parents, and they found that the construct was positively related to dispositional optimism. That is, teachers' self-efficacy may be a component of their academic optimism.

Teacher Authenticity

Authenticity can be defined as individuals' beliefs that their achievements are deserved and that others recognize those achievements as merited. Authenticity is characterized as the antithesis of the imposter syndrome, "a psychological syndrome or pattern based upon intense, secret feelings of fraudulence in the face of achievement tasks and situations" (Harvey & Katz, 1985, p. 3). The imposter syndrome is associated with depression, anxiety, low self-esteem, and other maladaptive personality factors (Bernard, Dollinger, Ramaniah, 2002; Mcgregor, Gee, & Posey, 2008). In addition, students who feel that they are imposters are more likely to engage in self-handicapping and take a performance approach to school (Kumar & Jagacinski, 2006; Ross, Stewart, Mugge, & Fultz, 2001).

Authenticity is also thought to be related to individuals' self-efficacy. Some scholars have suggested that imposter syndrome is associated with perceived competence and self-confidence (Bernard, Dollinger, Ramaniah, 2002; Friedbuchalter, 1992). Pajares (2001) and Usher (2006a) found that students higher in authenticity tended to also have higher self-efficacy. If, as Clance (1985) put forth, individuals who feel they are imposters find it difficult to internalize praise, such individuals may not be as open to social persuasions. Indeed, Usher found that authenticity was positively correlated with students' mastery experiences, vicarious experiences, and social persuasions, but was negatively correlated with physiological and affective states.

Invitations

Positive psychologists have contended that invitations, the messages that individuals send to themselves and others, can influence their beliefs and their behaviors (Purkey, 2000; Purkey & Novak, 1996). Because invitations are thought to serve as a vehicle through which individuals evaluate their potentiality, some scholars have explored how these messages influence self-efficacy. In one qualitative investigation, Pajares (1994) reported that the invitations that undergraduate students received as children serve to bolster or undermine their sense of competence as adult writers. He later found that the messages middle school students sent themselves and others were positively correlated with perceptions of efficacy, optimism, self-regulation, and self-concept (Pajares, 2001). Invitations were not, however, related to students' sense of authenticity. Usher and Pajares (2006a) posited that invitational messages function as a source of young students' self-efficacy independent of the four sources of self-efficacy hypothesized by Bandura (1997). Although they acknowledged that invitations share many characteristics of social persuasions, they distinguished the invitations from social

persuasions by conceptualizing them as messages *sent* rather than *received*. Indeed, students' invitations of themselves and others provided an additional contribution to the prediction of their academic self-efficacy after accounting for all hypothesized sources.

Demographic and Contextual Variables

As previously noted, teachers' self-efficacy may change according to the contexts in which they teach. In this section, I argue that teachers' background characteristics should be considered alongside these contextual variables. I outline some demographic and contextual variables that may influence teachers' self-efficacy, the strength of hypothesized sources, and the relationship between self-efficacy and its sources. I begin with a rationale for the study of these variables in teacher self-efficacy research. Next, I systemically address pertinent findings regarding race and ethnicity, gender, teaching experience, level of education, and contextual variables (e.g., characteristics of the classroom). When possible, I begin each section with a general review of findings on the relationship between each demographic or contextual variable and self-efficacy before exploring specific implications for teachers' self-efficacy.

Teachers' self-efficacy does not exist in a vacuum; it is subject to contextual factors that influence the teaching task. Scholars in the field generally characterize these factors as external to the teacher, such as the grade level, family environments, and the availability of resources (e.g., Chester & Beaudin, 1996; Tschannen-Moran & Woolfolk Hoy, 2007). According to Bandura's (1986) social cognitive theory, however, the relationship between environmental and personal factors is reciprocal. The teaching task is influenced not only by the characteristics of the students or the school, but also by the characteristics of the teachers themselves. For example, results of an experimental study revealed that female professors were more likely to receive negative student evaluations

than male professors who were matched by rank, department, and experience (Basow, 1995). In this case, the teaching environment and the social persuasions teachers received may have varied as a function of teachers' gender. In a related manner, vicarious experiences with teaching mentors may have less influence when the model is of a different ethnicity or gender, particularly because individuals generally attend more to models perceived as similar in some way (Bandura, 1997). These examples illustrate why the context in which individuals teach cannot be divorced from individuals' personal characteristics, such as gender, ethnic background, teaching experience, or level of education.

Race and Ethnicity

Researchers have documented that the hypothesized sources of self-efficacy may vary in their effect on self-efficacy as a function of individuals' ethnic or racial background. In one study, seventh grade South Asian students who had immigrated to Canada and enrolled in mathematics courses reported more positive vicarious experiences and social persuasions than did their Anglo Canadian peers (Klassen, 2004). Moreover, these vicarious experiences and social persuasions predicted mathematics self-efficacy for the South Asian immigrant students but not for Anglo Canadian students. In another investigation, Mexican American K-12 students reported knowing more positive mathematics models, but experienced less praise, fewer mastery experiences, and more anxiety than did White American students (Stevens, Olivarez, & Hamman, 2006). Usher and Pajares (2006b) found that sixth-grade African American students reported more intense physiological and affective states than did their White American counterparts. Vicarious experiences and physiological and affective states predicted general academic

self-efficacy for White American students but did not significantly predict the self-efficacy of African American students.

Less work has focused on the influence of race or ethnicity on teachers' sense of efficacy. Some researchers have found no relationship between teachers' race and their self-efficacy (Chester & Beaudin, 1996; Fives & Looney, 2009; Tschannen-Moran & Woolfolk Hoy, 2007). However, many of the samples used in studies of teacher self-efficacy were primarily composed of individuals who were White and female, reflecting the demographics of public K-12 teachers in the United States (National Center for Educational Statistics, 2009).

Milner and Woolfolk Hoy (2003) argued that race could play a role in teachers' interpretations of hypothesized sources of self-efficacy. For example, they reported that in a predominately White setting, stereotypes served as discouraging social persuasions for the African American teacher in their case study. On the other hand, the perception that one faced social barriers could also enhance the relative import of one's positive experiences. In an investigation of award-winning professors, an African American professor indicated that receiving a teaching award was a profound social persuasion because he received it despite institutional obstacles (Morris, 2009). Bandura (1997) noted that the formation of self-efficacy may differ for individuals who function in a prejudicial structure.

Gender

Scholars who have investigated the sources of students' self-efficacy have often found that the hypothesized sources do not vary as a function of gender, and many reported no gender differences in the influence of sources on self-efficacy (see Usher & Pajares, 2008, for a review). However, gender may play a role in how self-efficacy is

developed in different academic domains. Male students in K-12 and university settings have reported more powerful mastery experiences and lower physiological arousal than female students in mathematics and science, but girls in K-12 reported stronger mastery experiences and less anxiety in writing than did boys (Britner & Pajares, 2006; Lent, Lopez, Brown, & Gore, 1996). Significant others may play different roles in the academic lives of male and female students. Across grades, female students tend to report stronger social persuasions and vicarious experiences than their male peers (Lent et al., 1996; Lopez & Lent, 1992; Pajares, Johnson, & Usher, 2007; Usher & Pajares, 2006a, 2006b). However, only in Usher and Pajares' (2006a, 2006b) studies did social persuasions have a differential influence on boys' and girls' academic self-efficacy. In a qualitative investigation of professionals in scientific and mathematical careers, Zeldin, Britner, and Pajares (2008) found that women were more profoundly influenced by social persuasions and vicarious experiences than were men in such fields. Although such research is not directly related to the teaching task, it highlights the need for scholars to address how gender interacts with the sources of teaching self-efficacy.

As previously noted, some researchers have found little association been gender and the teaching self-efficacy of either experienced or novice teachers (Chester & Beaudin, 1996; Tschannen-Moran & Woolfolk Hoy, 2007). Others have reported that women have a higher degree of teaching self-efficacy at both the K-12 and university levels (Brennan, Robison, & Shaughnessy, 1996; Fives & Looney, 2009). I found that female professors were more likely to cite social messages as powerful sources of teaching self-efficacy (Morris, 2009). These professors also tended to seek the opinions of others in interpreting a negative event (e.g., poor student evaluations). Ross, Cousins, and Gadall (1996) explored the influence of gender by drawing from a sample of

secondary Canadian teachers that was evenly divided by gender. Results of the study indicated that the association of teaching self-efficacy to feelings of preparedness was particularly strong for men.

Teaching Experience

It may be difficult to ascertain the relationship of teachers' experience to their self-efficacy because the early departure of less-efficacious teachers may confound results (Tschannen-Moran & Woolfolk Hoy, 2007). Moreover, scholars who study associations between experience and self-efficacy may overlook the role of age, which can have a direct influence on teaching self-efficacy (Chester & Beaudin, 1996).

Some scholars have explored the impact of initial teaching experiences on individuals' sense of efficacy, but findings have been mixed. In one study, preservice teachers who had more teaching experience tended to be less self-efficacious (Capa Aydin & Woolfolk Hoy, 2005). Such a finding might be explained by the obstacles that teachers face in their first experiences in a realistic setting (Weinstein, 1988). However, other researchers have found little association or even a positive association between preservice teachers' self-efficacy and their experiences teaching in a realistic setting (Cantrell, Young, & Moore, 2003; Gurvitch & Metzler, 2009). Hoy and Woolfolk (1990) reported that student teachers' personal sense of efficacy rose during their student teaching, even when these teachers faced major pedagogical challenges. Woolfolk Hoy and Burke Spero (2005) similarly found that teaching self-efficacy increased during student teaching, but also indicated that it declined as teachers entered their first year in the field. The authors suggested that the relationship between teaching experience and self-efficacy may be mediated by the support young teachers receive during their initial experiences.

Chester and Beaudin (1996) suggested that the relationship between teacher experience and teaching self-efficacy may also be confounded by age. They found that younger novice teachers reported decreases in their self-efficacy during their first year in an urban school system, whereas older novice teachers completed the year with a heightened sense of efficacy. Age was less of a factor for experienced teachers new to the school system, whose self-efficacy generally declined over the course of the year. Social persuasions in the form of supervisor observations increased teachers' self-efficacy, regardless of their experience, and a lack of observations had a negative influence on their self-efficacy.

Tschannen-Moran and Woolfolk Hoy (2007) similarly examined the relationship of teaching self-efficacy, its sources, and teacher experience. Experienced teachers' overall teaching self-efficacy was significantly higher than that of novice teachers who had taught for three years or less. However, there was no difference in teaching self-efficacy for student engagement. Social persuasions in the form of support from parents and community were correlated with novice teachers' self-efficacy but failed to predict self-efficacy in regression analysis that included contextual variables, other demographic variables, and mastery experiences. For experienced teachers, the support of colleagues and the community contributed to the prediction of teaching self-efficacy. Mastery experiences in the form of satisfaction with past performances were moderately associated with self-efficacy for both career and novice teachers.

Level of Education

Because research on teaching self-efficacy has tended to focus on preservice teachers, few scholars have studied the influence of level of education on career teachers' sense of efficacy. It would seem that holding an advanced degree might make teachers

more confident as instructors. For example, if the advanced degree is in a content field, it may bolster teachers' content knowledge. If the degree relates to teaching, it may bolster teachers' pedagogical knowledge. As previously discussed, the mastery of both content and pedagogical knowledge can serve as powerful mastery experiences that enhance teachers' self-efficacy. Ross et al. (1996) indicated that secondary teachers who felt well prepared to teach described a higher teaching self-efficacy. Milner and Woolfolk Hoy (2003) observed that, for the teacher in their case study, having attained a PhD served as a powerful mastery experience that enhanced her sense of efficacy. However, Chester and Beaudin (1996) found that other aspects of a teacher's educational background (i.e., SAT score, GRE score, selectivity of their undergraduate school) did not predict teaching self-efficacy.

Contextual Variables

Other factors that influence teachers' experiences may have more to do with the environment in which teaching occurs than with the background of the teacher. Characteristics of a classroom, such as class size, ability grouping, and grade level, influence perceptions of teaching self-efficacy (Raudenbush et al., 1992; Ross, Cousins, & Gadalla, 1996; Ross, Cousins, Gadalla, & Hannay, 1999). Tschannen-Moran and Woolfolk Hoy (2007) found that the availability of teaching resources may also affect novice teachers' self-efficacy. Chester and Beaudin (1996) reported that although available resources were positively related with self-efficacy for older teachers at different levels of experience, younger teachers were generally less confident with more resources at their disposal. The investigators suggested that the existence of multiple sources could overwhelm younger teachers in their decision-making process. Tschannen-Moran and Woolfolk Hoy (2007) reported that the self-efficacy of teachers in urban

regions did not differ from that of teachers in other regions. As previously noted, however, experienced teachers new to an urban school system generally became less confident in their capabilities (Chester & Beaudin, 1996).

Teachers' self-efficacy can also vary according to the subject they teach. Ross et al. (1999) found that individuals asked to teach outside of their content area experienced lower self-efficacy. Moreover, the investigators reported that the influence of feelings of successes on teaching self-efficacy was greater for English, social studies, and art teachers than it was for mathematics and science teachers.

Teachers' self-efficacy may also be influenced by the perceived background of their students. Researchers have reported that students' socioeconomic status, gender, and culture can influence teachers' expectations for student motivation and student achievement (Auwarter & Aruguete, 2008; Tyler, Boykin, & Walton, 2006). Teachers with low self-efficacy are more likely than their self-efficacious peers to refer students of a lower socioeconomic status for special education (Podell & Soodak, 1993). The link between teachers' self-efficacy and students' characteristics may also be related to teachers' unfamiliarity with the needs of students from a different background. For example, preservice teachers reported high self-efficacy for developing relationships with students and for incorporating them into the classroom, but low self-efficacy for communicating with English language learners (Siwatu, 2007).

Synthesis

A growing body of research has revealed that teachers' sense of efficacy influences their cognitive processes, motivation, and behavior. Self-efficacious instructors typically plan and organize more effectively, are more likely to employ and seek out engaging instructional strategies, put forth greater effort in motivating their

students, and are more resilient when faced by obstacles than are teachers with lower self-efficacy. Moreover, students of teachers with higher self-efficacy tend to have higher expectations of themselves, perform better on standardized tests, and report higher academic self-efficacy. Given the considerable benefits associated with teachers' self-efficacy, investigators have begun to turn their attention toward the sources underlying these important beliefs. However, research on the hypothesized sources of self-efficacy is still in its infancy, and the few studies that have tested their relation to teaching self-efficacy have reported mixed findings.

A number of methodological shortcomings have prevented a clear understanding of how teachers form their efficacy beliefs. First, researchers have often assumed that the sources of preservice teachers' efficacy beliefs will be identical to the sources of practicing teachers' self-efficacy. Potentially misleading results might emerge if generalizations about the sources of practicing teachers' self-efficacy beliefs are based on studies of preservice teachers. Second, most studies typically have not tested the independent effect of each source on perceptions of efficacy. Including all four hypothesized sources of self-efficacy in one model could lead researchers to more complete results. Finally, items used to gauge the sources have often been inconsistent with social cognitive theory, and have thus obscured what is known about how Bandura's (1997) hypothesized sources function in the teaching domain.

Shortcomings in the measurement of the sources of teaching self-efficacy illustrate the need for a theoretically-based scale of the hypothesized sources of self-efficacy. Such a scale would likely prove valuable to subsequent research efforts. The scale may also inform future professional development, as scholars who have imposed

interventions that target the sources have generally reported improvements in participants' self-efficacy.

Mastery experiences have been a common focus of studies of the hypothesized sources of self-efficacy, although findings have been confounded by the use of inconsistent measures. When assessed merely as previous teaching experiences, mastery experiences have proven an unreliable predictor of teaching self-efficacy. Researchers who have defined mastery experiences in terms of successful or satisfactory performances have reported positive correlations between the source and self-efficacy. Perceived mastery of content and of pedagogical skills also served as powerful mastery experiences.

Researchers have typically found that teachers' vicarious experiences are weakly associated with their sense of efficacy. Whether measured as comparisons with colleagues or with mentors, few studies have found a significant relationship between these experiences and teachers' self-efficacy. Some scholars have attributed such results to narrow measures of the source or to the lack of available models for inservice teachers. Social persuasions can be particularly informative sources of teaching self-efficacy, but measures used to assess this source have differed markedly. Some researchers have identified teachers' perceptions of student enthusiasm as socially persuasive, although perceptions of enthusiasm might be better categorized as mastery experiences. When assessed in terms of support from others, persuasions have correlated weakly and often nonsignificantly with self-efficacy.

Only a few researchers have explicitly addressed the relationship of physiological and affective states to teachers' sense of efficacy. Those who have measured this source report that physiological states inform self-efficacy to a lesser extent than do the other

hypothesized sources of self-efficacy. However, individuals' ability to regulate their emotions may also influence their sense of efficacy.

Theory and practice may also be enhanced by research on the relationship of teaching self-efficacy and its sources to teachers' satisfaction, stress, collective efficacy, optimism, authenticity, and invitations. In particular, knowing how the sources and self-efficacy are related to these additional variables may prove useful for the training and professional development of educators. Such research may provide clues as to how teachers may be guided to healthier and more adaptive approaches.

CHAPTER III

METHODS

In this chapter, I present the methods I used in this dissertation study. I begin by providing once more the research questions that guided the study. I then offer an overview of the data that were gathered for this study and provide a description of the study participants and location. Next, I summarize the data sources. Finally, I present my data analyses and describe the ways that I evaluated validity and reliability.

Research Questions

The questions that guided this investigation are as follows:

1. What are the psychometric properties of a scale designed to assess the sources of teaching self-efficacy?
2. What is the independent contribution of each of the sources of teaching self-efficacy to the prediction of teachers' self-efficacy?
3. Are there mean differences in the sources of teaching self-efficacy as a function of teachers' experience and level of education?
4. What is the relationship among teaching self-efficacy, its sources, and teachers' satisfaction, stress, collective efficacy, optimism, authenticity, and invitations?

Data Used in the Study

Data used in this study were secondary data collected via a teacher survey (Usher, 2006b) during the 2005-2006 academic year (see Appendix A). In most cases, participation was solicited at faculty meetings or in individual meetings with teachers. Teachers placed their completed surveys and forms in a designated box in the office to be collected by the investigator. Data were also collected from teachers enrolled in an evening Master's degree program, who returned their surveys by mail.

A portion of the data collected was analyzed in collaboration with international researchers (Klassen et al., 2009, in press; see Appendix B). The remaining portion of the data, which included teachers' responses to items designed to measure the hypothesized sources of self-efficacy, optimism, authenticity, and invitations, had not yet been analyzed (see Appendix C).

Participants and Setting

Participants in the study were 144 teachers (131 women, 13 men) in elementary and middle schools in the Southeastern United States. Descriptive statistics regarding participants' background and teaching context (e.g., ethnicity, age, school type) can be found in Table 3. Most participants were White (83%) and female (91%). Most were under the age of 40 and had taught at their current school for five years or less. Half of the participants had fewer than 10 years of total teaching experience, and most had attained at least a Master's degree. Participants taught in a variety of areas, and most were responsible for teaching more than one subject.

One hundred ten of the 144 participants provided the names of their schools. These individuals taught in seven schools, including three public elementary schools, three public middle schools, and one private school that served primary and secondary grades. The three elementary schools were located in a different district than the three middle schools. Descriptive statistics related to the schools and to the students enrolled in the 2005-2006 school year can be found in Table 4. Data pertaining to students' gender, ethnicity, and eligibility for free or discounted lunch were available online at a site maintained by the National Center for Educational Statistics (2010). Student populations at these schools were relatively balanced with regard to gender, but varied greatly with regard to ethnicity. Whereas White students accounted for 81% of all

students in one school, African American students accounted for 97% of the student population in another. The percentage of students eligible for free or discounted lunch ranged from 8% to 55%. However, the majority of teachers (94%) reported their students' socioeconomic status to be average or high. There are two possible explanations for this seeming contradiction. The first is that teachers in the sample tended to work in those schools where few students were eligible for free or discounted lunch. The second is that teachers may have worked with students who were not representative of the school population.

Instrumentation

The teacher survey (Appendix A) comprised eight scales, each of which is described below. Items crafted to assess the sources of teaching self-efficacy were newly designed. All other items were derived or adapted from previously constructed scales. Teachers responded to items using a Likert-type scale with a range of 1 to 9. Descriptive statistics for all previously used scales are presented in Table 5. According to Kline's (1998) guidelines, skewness and kurtosis of items on these scales were acceptably low (i.e., < |3| for skewness and < |10| for kurtosis).

Sources of Teaching Self-Efficacy

The Sources of Teaching Self-Efficacy Scale was created by Ellen Usher in 2005. All items were designed in accordance with Bandura's (1997) descriptions of the sources. These items were evaluated by two graduate students familiar with social cognitive theory and by one expert in the field. Fifteen items assessed mastery experiences (e.g., "My last teaching evaluation was excellent"), 16 assessed vicarious experiences (e.g., "Compared to other elementary school teachers, I am quite good at teaching"), 15 assessed social persuasions (e.g., "People I respect believe that I can succeed as a

teacher"), and 15 assessed physiological and affective states (e.g., "I start to feel stressed whenever I think about teaching"). Items were both positively and negatively worded. Negatively-worded items were reverse coded prior to analysis.

Teaching Self-Efficacy

Teaching self-efficacy was assessed using the short form of Tschannen-Moran and Woolfolk Hoy's (2001) Teachers' Sense of Efficacy Scale (TSES). The scale is divided into three subscales: Efficacy for Instructional Strategies (e.g., "To what extent can you craft good questions for your students?"), Efficacy for Classroom Management (e.g., "How much can you do to control disruptive behavior in the classroom?"), and Efficacy for Student Engagement ("How much can you do to motivate students who show low interest in school work?). Using second order factor analyses, Tschannen-Moran and Woolfolk Hoy (2001, 2007) found that items used in the subscales of the TSES had high loadings on a single factor, indicating that the total scale measures an underlying and more general teaching self-efficacy. Cronbach's alpha coefficient for the short form has been reported to be .90, with reliabilities of the three subscales ranging from .81 to .86 (Tschannen-Moran & Woolfolk Hoy, 2001). Researchers have additionally found evidence of the scale's general validity across a variety of cultural settings (Klassen et al., 2009). In the current study, Cronbach's alpha for the full scale was .87. Reliabilities of the Efficacy for Instructional Strategies, Efficacy for Classroom Management, and Efficacy for Student Engagement subscales were .77, .87, and .82, respectively.

Teacher Satisfaction

Teacher satisfaction was measured using five items, four of which were drawn from Smith, Kendall, and Hulin's (1969) Job Descriptive Index (see Caprara et al., 2003).

One additional item was constructed that pertained specifically to the practice of teaching (e.g., "I am satisfied with teaching in my current location"). Reliabilities for the subscales of the original Job Descriptive Index were reported to range from .87 to .89 (Kinicki et al., 2002). Cronbach's alpha coefficient for the full scale was .87.

Teacher Stress

Teacher stress was measured with a single item, "I find teaching to be very stressful." This item was used in Klassen et al.'s (in press) cross-cultural investigation of teachers' collective efficacy, job satisfaction, and job stress. As Tschannen-Moran and Woolfolk Hoy (2001) noted, single-item measures "often are unreliable and cannot capture multifaceted dimensions" (p. 794) of a construct. However, many researchers have used a single item to assess teacher stress (e.g., Boyle, Borg, Falzon, & Baglioni, 1995; Chaplain, 2008; Manthei, Gilmore, Tuck, & Adair, 1996).

Collective Teacher Efficacy

Collective teacher efficacy was measured using Tschannen-Moran and Barr's (2004) 12-item Collective Teacher Belief Scale. Six items were designed to gauge instructional strategies (e.g., "How much can teachers in your school do to produce meaningful student learning?"), and six were designed to gauge student discipline (e.g., "How well can teachers in your school respond to defiant students?"). Reliability in Tschannen-Moran and Barr's study was .97. In the present study, Cronbach's alpha was .87. Reliability of the Instructional Strategies subscale was .85, and reliability of the Student Discipline subscale was .80.

Optimism

Twelve items from Scheier and Carver's (1985) Life Orientation Test were used to measure teachers' optimism. Half were worded optimistically (e.g., "I feel confident

that I will succeed in the future") and half were worded pessimistically (e.g., "Good things never happen to me."). Pajares (2001) used the scale in his study of middle school students and reported that Cronbach's alpha coefficient was .83. In the present study, reliability was .89.

Teacher Authenticity

Teacher authenticity was measured with six items drawn from Clance's (1985) inauthenticity scale and Harvey and Katz's (1985) imposter syndrome scale. These items were adapted for pertinence to teaching. For example, the item, "Sometimes I'm afraid other people will discover that I'm not very smart" was altered to read, "Sometimes I'm afraid other people will discover that I'm not a very good teacher." Pajares (2001) reported a Cronbach's alpha coefficient of .72. Reliability of the modified items in this study was .85.

Invitations of Self and Others

The Invitations of Self and Others scale was derived from the Inviting/Disinviting Index-Revised and consists of two subscales representing the degree to which individuals send themselves invitational messages (e.g., "I am quick to recognize my own value as a teacher") and send such messages to others (e.g., "I am quick to recognize the value of others with whom I work"; Valiante & Pajares, 1999; and see Schmidt, Shields, & Ciechalski, 1998; Wiemer & Purkey, 1994). Items from the original scale were modified for pertinence to teaching. For example, the item, "I congratulate myself on my successes" became, "I congratulate myself on my teaching successes." Cronbach's alpha coefficients in these studies ranged from .76 to .81.

Factor analysis of the original scale used with students revealed one factor underlying invitations of self and a second factor underlying invitations of others, with

factor structure coefficients ranging from .40 to .83 (Pajares, 2001; Usher & Pajares, 2006a). Factor analysis was again used in the present study because the scale had been adapted for teachers. Initially, three factors had eigenvalues greater than 1. However, I found a clear break in the scree plot after the second factor. Moreover, items that loaded onto the third factor (IO2, IO4, IO5) were not meaningfully different from items on the second. Only two factors were examined in subsequent analysis, and items loaded appropriately. Factor loadings on the Invitations of Self subscale ranged from .72 to .87. Loadings on the Invitations of Others subscale ranged from .36 to .73. The item with the weakest loading (IO1) also had the lowest item-subscale correlation (r = .31). Nonetheless, the item was retained for further analysis because it was conceptually similar to other items on the subscale. Cronbach's alpha for the scale was .86. Reliability of the Invitations of Self subscale was .89, and reliability of the Invitations of Others subscale was .73.

Data Analysis

My first objective in this study was to explore the psychometric properties of the 61 items designed to assess the hypothesized sources of self-efficacy. I used three primary screening methods to determine whether items should be flagged for possible removal. First, I examined each item to see if responses were normally distributed. This step was taken because subsequent statistical methods employed maximum likelihood estimation, for which normality is an assumption. Following Kline's (1998) recommendation, I considered skewness greater than the absolute value of 3 and kurtosis greater than the absolute value of 10 to be problematic. Second, I examined the correlation between each item and its scale total (e.g., each mastery experience item was correlated with the scale total for all mastery experience items). Items with correlations

less than .30 with the scale total were flagged for removal. Third, I examined correlations of each item with the three subscales of the Teacher Sense of Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001) to determine whether the relationship matched theoretical expectations. I flagged items that correlated weakly (< |.20|) with any of the teacher self-efficacy subscales.

I kept a record of the flagged items and the reason they were flagged to decide whether to retain them for further analyses. The decision to eliminate items from further analyses was informed by the number of flags an item received as well as the severity of a given psychometric flaw.

After removing items that were not psychometrically sound, I used exploratory factor analysis to evaluate whether the items designed to assess the sources of teaching self-efficacy could be explained by underlying constructs. A *factor* is a hypothetical latent variable that is measured by one or more observable variables. Exploratory factor analysis is recommended during the initial scale development stages because it allows the investigator to identify items that do not measure an intended factor (Worthington & Wittaker, 2006). Such analysis can be used to reduce the number of items in a scale to produce a reliable instrument composed of items that are meaningfully related (Netemeyer, Bearden, & Sharma, 2003). Exploratory factor analysis was also appropriate because more than one latent variable could underlie a single source of self-efficacy identified by Bandura (1997). For example, vicarious experiences could be further divided into modeling and referential comparison components. The small sample size of 144 participants may be considered minimally adequate for factor analysis (Comrey & Lee, 1992).

Factors were extracted using the principal axis method, which provided eigenvalues for each initial factor. Eigenvalues are a measure of the variance accounted for by a factor. To determine how many factors to retain, I first examined the number of factors with eigenvalues greater than 1.00. In addition, I used Cattell's (1966) scree test to plot the eigenvalues for each factor. Large breaks in the plot were used as visual indicators of factors that accounted for most of the variance.

Bandura (1997) maintained that the sources of self-efficacy are often interrelated. In reviewing work in the field, Usher and Pajares (2008) similarly noted that the hypothesized sources tended to be correlated. I therefore performed a promax oblique rotation on the retained factors, which allowed factors to correlate (Thompson, 2004). A rotated factor pattern allows for easier interpretation because it presents higher loadings on certain factors and lower loadings on the remaining factors. I examined factor loadings on the rotated factor pattern matrix to determine which items to retain. The goal of my factor analysis was to produce a scale with a simple structure. The concept of a "simple structure," first conceived by Thurstone (1935), refers to results that are interpretable and conceptually meaningful. According to Pedhauzer and Schelkin (1991), evidence of simple structure is ideally demonstrated when "each [item] has a high, or meaningful, loading on one factor only and each factor has high, or meaningful, loadings for only some of the [items]" (p. 612). My decisions to retain or eliminate items were based on conceptual considerations and not merely empirical results. I considered excluding any items with loadings less than |.35| (Thompson, 2004). I also flagged for possible removal items with high loadings ($\geq$ |.40|) on more than one factor. As another consideration, I flagged items that shared high loadings with items that were not meaningfully related.

Following exploratory factor analysis, I assessed the internal consistency of the newly created subscales using Cronbach's alpha. I then examined correlations between the sources and measures of teaching self-efficacy. Because the sources are believed to inform self-efficacy, these variables were expected to be related.

My second objective in this study was to determine whether the sources of self-efficacy made an independent contribution to the prediction of teachers' overall self-efficacy and their self-efficacy for instructional strategies, for classroom management, and for student engagement. I conducted four separate regression models in which these four teaching self-efficacy variables served as dependent variables and the sources of self-efficacy served as predictors. Regression analysis clarified the independent influence or relative weight of each source on teachers' self-efficacy. Given that the sources can be highly correlated, I assessed multicollinearity by examining the variance inflation factor for each explanatory variable. In addition, I used White's (1980) test to determine whether the model was heteroskedastic. I used both beta coefficients and structure coefficients to interpret my results. In the context of regression analysis, structure coefficients measure the bivariate relationship between a dependent variable and an independent variable divided by the multiple correlation. Courville and Thompson (2001) have recommended that researchers interpret structure coefficients because they are not biased by multicollinearity. I also reported uniqueness indexes, which represent the amount of unique variance accounted for by a given predictor.

My third objective in this study was to determine whether the sources of teaching self-efficacy vary as a function of teachers' experience and level of education. Such differences were explored using one-way, between groups, analysis of variance. In the first model, level of education functioned as an independent variable, and the sources

served as dependent variables. Participants were compared according to the highest degree they had attained, whether a Bachelor of Arts (n = 63) or a Master's (n = 72). In the second model, teaching experience served as the independent variable. Teachers with five or less years of experience (n = 41) served as the less experienced group because researchers performing similar studies have generally defined novice teachers as those in their first few years of teaching (Chester & Beaudin, 1996; Tschannen-Moran & Woolfolk Hoy, 2007). Teachers with more than five years of experience (n = 101) served as the experienced group. Effect sizes, as measured using the index d (Cohen, 1977), were used to measure the strength of the associations between the variables. For my analyses of variance, I used the PROC GLM function of SAS software version 9.2 (SAS Institute, Inc., 2008). The PROC GLM function was preferred because it is appropriate for studies with unequal cell sizes (Hatcher, 1994).

My final study objective was to explore the relationships between teacher self-efficacy, its sources, teacher satisfaction, teacher stress, collective teacher efficacy, optimism, teacher authenticity, and invitations. Due to the small sample size, only correlation analysis was used to examine these associations. The matrix found in Table 5 represents expected correlations between the variables, where "+" represents an expected positive correlation, "-" an expected negative correlation, and "?" an unknown correlation. These expected values were derived from theoretical hypotheses and previous studies in which similar correlations were explored (see Chapter 2). All statistical analyses for this study were performed using SAS software version 9.2 (SAS Institute, Inc., 2008).

Reliability and Validity

Evidence for validity was evaluated in several ways. Construct validity requires complex internal and external evidence (Haller & Kleine, 2001). Internal evidence of validity refers to intrinsic characteristics of a measure such as its content and relationship to a wider theoretical framework (Wasserman & Bracken, 2003). Evidence for the content validity of the sources of teaching self-efficacy items was bolstered prior to data collection by having items read by three individuals familiar with social cognitive theory. This review of content validity was again repeated in the study with two graduate students familiar with social cognitive theory.

Evidence of external validity is established when different measures share a relationship consistent with theoretical expectations (Wasserman & Bracken, 2003). External validity can refer to convergent validity, discriminant validity, and criterion-related validity. Convergent validity is assessed by examining the correlations between measures designed to assess similar constructs. In this study, I explored correlation matrixes to determine whether items that were conceptually similar were highly correlated. For example, I expected that the item "teaching is stimulating for me" would be correlated with the item "I look forward to going to work each day" because both were designed to measure similar phenomena. High intercorrelations between items on a scale may indicate that the scale measures a single construct (Standards for Educational and Psychological Testing, 1985). I also examined item–to-subscale totals for all items in the study to evaluate whether items were highly correlated with those items that presumably measured the same variable. Exploratory factor analysis served as another method to establish convergent validity on an item level. I used factor analyses to assess the sources of teaching self-efficacy items and found evidence of convergent validity when

theoretically related items loaded onto the same factors. On a multi-item variable level, convergent validity can be assessed by examining a correlation matrix of all constructs in the study. I expected, for example, that stress would be highly correlated with physiological and affective states.

Divergent validity is established when correlations between measures designed to assess different constructs are weak or nonsignificant. Evidence of divergent validity was examined in much the same way as evidence for convergent validity. When I had reason to believe that latent variables were less related, I looked for low item-to-item correlations, low or negative item-to-scale or subscale total correlations, and items that loaded onto different factors.

Evidence of criterion-related validity is demonstrated when a measure is highly correlated with a theoretically related outcome. In this study, items designed to assess the sources of teaching self-efficacy were flagged for possible removal when they were weakly associated with measures of teaching self-efficacy. On the multi-item variable level, the relationship of the sources to teaching self-efficacy and collective teacher efficacy was examined using correlation analysis. In addition, measures of teacher self-efficacy were regressed on the final sources scale. As another consideration, the relationships of teaching self-efficacy, collective teacher efficacy, teacher stress, and teacher satisfaction were analyzed in light of the findings presented in larger studies for which a portion of this data were used (Klassen et al., 2009, in press).

The reliabilities of all scales and subscales were assessed using Cronbach's alpha to determine the internal consistency of items in a given set. Henson (2001b) recommended that reliabilities be at least .80 for general research purposes.

There are certain threats to internal and external validity inherent in such a study that should be acknowledged. Participants completing a self-response survey may not be willing or able to portray themselves accurately (Ben-Porath, 2003). Moreover, participants' self-selection processes may have undermined the generalizability of findings. For example, teachers who were already confident in their capabilities may have been more willing to participate in a survey about teaching. In addition, the school context in which they developed their sense of efficacy may not have been representative of schools across the globe. Another possible threat to validity is that of construct underrepresentation, in which a given construct is measured too narrowly (Wasserman & Bracken, 2003). This is a particular concern with regard to the sources of teaching self-efficacy scale, especially as Bandura (1997) described the sources in broad terms.

CHAPTER IV

RESULTS

In this chapter, I present the results of my data analysis. Recall that my first objective, consistent with my first research question, was to explore the psychometric properties of items designed to assess the sources of teaching self-efficacy. To this end, I examined descriptive statistics and the results of exploratory factor analysis to determine which items to retain for my final scale. My second objective was to assess the independent contribution of each of the sources of teaching self-efficacy to the prediction of teachers' self-efficacy. Therefore, I regressed teaching self-efficacy on each of the sources in the final scale. My third objective was to explore whether there are differences in the sources of teaching self-efficacy as a function of teachers' experience and level of education. I used analysis of variance to investigate differences in the mean level of each source of self-efficacy as a function of these categorical variables. My final objective was to explore the relationship among teaching self-efficacy, its sources, and other teacher motivation variables. To this end, I examined correlation matrixes in which all of these variables were included. The major sections below correspond to these four guiding objectives.

Creation and Analysis of the Sources of Teaching Self-Efficacy Scale

My primary objective in this study was to explore the psychometric properties of items designed to assess Bandura's (1997) hypothesized sources of teaching self-efficacy. I begin by presenting descriptive statistics for all items used to measure the sources of self-efficacy. I then describe the results of an exploratory factor analysis on all retained items.

Descriptive Statistics

Sixty-one items were initially used to measure the sources of teachers' self-efficacy. Item means, standard deviations, skewness, kurtosis, and correlations with self-efficacy measures are presented in Table 6. The table also includes correlations between each item and the total score of all other items that assess the same hypothesized source (i.e., *r*-total correlations).

Several factors influenced my decision to retain or omit items. Two mastery experience items, ME1 and ME3, were removed from further analysis because the phrases "I am good at teaching" and "I teach very well" more closely resembled self-efficacy or self-concept appraisals than mastery experiences. This decision was based on a content validity review with two graduate students familiar with Bandura's (1986) social cognitive theory. Two more items (SP1 and SP3) were dropped because their values exceeded the extremes identified by Kline (1998) of |3| for skewness and |10| for kurtosis. That is, the distributions of responses for these items were exceptionally asymmetrical or peaked. Including such items in a scale could potentially present a problem for subsequent analyses because normality is assumed in maximum likelihood estimation. When the distribution of a variable is significantly non-normal, statistical tests involving the variable may produce inaccurate results.

Many items had weak correlations with the total score of all other items used to assess a given source. I flagged all items with item-total correlations below .30 for possible removal. These included four mastery experience items, nine vicarious experience items, eight social persuasion items, and one item physiological and affective states item. Item-total correlations ranged from -.24 to.62 for mastery experiences, from

.05 to .43 for vicarious experiences, from .06 to .59 for social persuasions, and from .01 to .64 for physiological and affective states.

I also explored the associations between each item and the three self-efficacy measures (i.e., self-efficacy for instructional strategies, for classroom management, and for student engagement). Items with correlations below |.20| were flagged for possible elimination. Correlations between the mastery experience items and the three teaching self-efficacy subscales ranged from .02 to .44. Correlations with vicarious experiences ranged from .00 to .39. Correlations with social persuasions (.00 to .42) and physiological and affective states (-.00 to -.44) were similarly low. All but seven of the initial scale items were flagged because they had an item-total correlation below .30 or a correlation with a teaching self-efficacy subscale below |.20|.

I therefore determined that a lenient criterion for elimination was necessary to retain a substantial number of items for exploratory factor analysis. I eliminated only those items with item-total correlations below .15 and correlations lower than |.15| with two or more domains of self-efficacy. Six items (ME11, ME14, VE3, VE4, VE15, and PA3) were dropped from further analysis due to low item-total correlations. An additional 11 items (ME13, VE8, VE13, SP5, SP10, SP11, SP14, SP15, PA9, and PA13) were eliminated as a result of their weak correlations with outcome measures (i.e., the teaching self-efficacy subscales). In total, 21 items were dropped and 40 were retained for exploratory factor analysis.

Exploratory Factor Analysis

Although the items were crafted to parallel the four sources hypothesized by Bandura (1997), exploratory factor analysis was employed to determine how many latent variables accounted for most of the variance in the data. In deciding the number of

factors to retain, I first examined factors with eigenvalues above 1.0 (the Kaiser criterion). I found that 12 factors had eigenvalues over 1.0, but I did not base my decision solely on this finding because doing often leads to inaccurate results (Osborne & Costello, 2005). In addition, it may be difficult to interpret such a large number of factors.

I examined a screeplot of eigenvalues and found no obvious "elbow" to the plot. However, breaks in the plot were fairly small after the fifth factor, indicating that four factors accounted for much of the variance in the data. Factor 1 accounted for 20.6% of the variance, Factor 2 accounted for 8.1%, Factor 3 accounted for 6.8%, and Factor 4 accounted for 4.9%. The next six factors each explained 3.0% to 4.2% of the variance. The screeplot of eigenvalues from the initial analysis is shown in Figure 2.

According to Thompson (2004), researchers should be guided by theoretical and conceptual considerations in their approach to identifying a simple, or interpretable, structure. I explored factor loadings to see if several items that shared meaningful relationships loaded onto factors beyond Factor 4. Only two items (ME9 and SP4) had significant loadings on Factor 5, and a comparison of the items revealed no obvious conceptual similarities. No items had high (> |.40|) loadings on Factor 6. Two items (ME6 and VE5) loaded onto Factor 7, but these items did not appear to share a meaningful relationship. No two items loaded on the same factor for Factors 7 through 12. Thus, factors beyond Factor 4 did not appear to represent a simple structure.

Given the results of the latter analyses, I chose to retain only four factors for all subsequent factor analyses. I reran the exploratory factor analysis and performed a promax oblique rotation on these factors. I used several criteria to decide which items to remove from further analysis. I first looked for items with loadings of less than or equal

to |.35| on all factors (Thompson, 2004). I also looked for items with high (> |.40|) loadings on multiple factors. Before I eliminated items due to weak or split loadings, however, I carefully examined them to determine whether it was best to retain the item for the sake of creating a more comprehensive scale. For example, the item "I have always been good at teaching" was retained because it was the only remaining mastery experience item phrased in positive terminology. In an effort to maintain simple structure, I also eliminated items that did not load in conceptually meaningful ways.

I removed items one at a time, each time repeating the factor analysis process but restricting my analysis to four factors. When more than one item had weak loadings on all factors, I chose first to eliminate the item with the weakest loading. This method resulted in the removal of two items (SP4 and SP13). When more than one item had high split loadings, I eliminated items with the highest loadings on both factors first. Using this criterion, I deleted an additional six items (SP8, VE2, PA1, ME6, ME9, and VE16). When several items loaded in conceptually inconsistent ways, the most extreme cases were eliminated first until a meaningful structure was achieved. Twelve items (SP2, VE9, VE6, ME7, VE10, VE1, ME15, PA12, PA6, ME4, PA5, and VE5) were dropped because they did not load with conceptually similar items. For example, the item "People have told me that I'm successful in the classroom because I work hard" was deleted because it loaded onto the same factor as several vicarious experience items. Although social persuasions and vicarious experiences both serve as social influences on self-efficacy, there is a conceptual difference in the information that individuals receive from social messages and from social comparisons. In all, 20 items were removed during the factor analysis stage. A list of all eliminated items, along with the criteria on which their elimination was based, can be found in Table 8.

Table 9 displays the factor loadings and communalities for all items of the final sources of teaching self-efficacy scale. Although I explored the possibility that alternative latent variables might explain the relationships between items, the items tended to load onto factors in ways consistent with Bandura's (1997) descriptions. The final scale was composed of 20 items.

Among these items, the four designed to assess mastery experience (ME2, ME5, ME8, and ME12) loaded onto Factor 4, with loadings ranging from .45 to .82. One of these items ("I have always been good at teaching") measured past success. Two items measured past teaching failures (e.g., "Even when I plan for hours, I don't teach very effectively"). The remaining mastery experience item ("I do not feel as though I have developed enough strategies to perform my job well") tapped past mastery of teaching-related strategies.

Four vicarious experience items (VE7, VE11, VE12, and VE14) loaded onto Factor 3, with loadings ranging from .57 to .85. Two of these items pertained to experiences with colleagues that enhanced teachers' instructional skills or approaches (e.g., "By watching excellent teachers around me, I often learn better ways to approach my own teaching"). Two dealt with the cognitive exercise of self-modeling (e.g., "I often think or talk through difficult teaching problems I might encounter"). Although I attempted to retain items that assessed individuals' comparisons with other teachers, these items tended to load with mastery experiences and were therefore omitted in favor of less conceptual ambiguity.

The four social persuasion items (SP6, SP7, SP9, and SP12) loaded onto Factor 2, with loadings ranging from .49 to .81. Like the retained vicarious experience items, all were phrased positively ("Most of my students' parents believe I'm a good teacher"). As

will be later discussed, this might indicate a bias of the factor analysis. However, the social persuasion subscale was adequately broad for a four-item measure in that it assessed the messages teachers receive from multiple sources.

The eight physiological and affective states items (PA2, PA4, PA7, PA8, PA10, PA11, PA14, and PA 15) loaded onto Factor 1, with loadings ranging from .44 to .79. The final subscale represented a wide range of physiological and emotional states. Moreover, it included items that were worded both positively ("I feel relaxed when I am teaching") and negatively ("Teaching makes me exhausted").

Inter-factor correlations can be found in Table 10, and correlations among the sources items retained in the final scale are presented in Table 11. Mastery experiences and social persuasions were the most highly correlated of the hypothesized sources, r = .50. Vicarious experiences were not correlated with any other source. However, all other correlations between the sources were statistically significant.

Table 12 displays means, standard deviations, and zero-order correlations for teaching self-efficacy and its sources. The hypothesized sources were significantly related to teaching self-efficacy and its subscales. The weakest correlations were between vicarious experiences and self-efficacy, which ranged from .18 to .24. Correlations between the sources and self-efficacy for classroom management were also weak, ranging from |.17| to|.21|. Overall, these findings appear to match the expected correlations reported in Chapter 3. Although these correlations were weak to moderate, they provided some additional evidence that the sources subscales did measure constructs related to teachers' self-efficacy.

Reliability

The reliabilities of the subscales were generally low according to Henson's (2001b) guidelines. Cronbach's alpha for the mastery experiences subscale was .66, and item-subscale correlations ranged from .38 to .50. Reliability of the vicarious experiences subscale was .63, with item-subscale correlations ranging from .29 to .60. Cronbach's alpha for the social persuasion subscale was .72, and item-subscale correlations ranged from .44 to .62. Finally, reliability of the subscale for physiological and affective states was .82, with item-subscale correlations ranging from .37 to .68. The reliabilities of the vicarious experiences and physiological and affective states subscales could have been slightly improved with the deletion of some items. However, I chose to retain these items so that the subscale would incorporate an appropriately broad range of experiences associated with a given source. For example, the item, "My colleagues help make challenging teaching problems seem more manageable," was included in the final subscale despite its low item-subscale correlation because it was the only item to assess the influence of coping models. It may be difficult to attain reliable subscales when those subscales are composed of only a few items. Moreover, Bandura (1997) characterized the sources using broad terms, and designing scales to measure an array of experiences may have undermined the internal consistency of related items.

Summary

Of the initial 61 items designed to assess the hypothesized sources of self-efficacy, 21 were eliminated due to concerns about their wording, skewness, kurtosis, correlations with self-efficacy, and correlations with all other related items. Exploratory factor analysis revealed that four factors underlay the remaining 40 items, and these factors comprised items corresponding to the four hypothesized sources of self-efficacy.

The final scale was composed of four mastery experience items, four vicarious experience items, four social persuasion items, and eight physiological and affective states items. The reliabilities of all but the physiological and affective states subscale were low according to Henson's (2001b) guidelines. Correlations among the sources and between the sources and teaching self-efficacy were statistically significant.

Relationships between the Sources and Self-Efficacy

In line with my second objective, I examined the criterion validity of the newly created scale by analyzing the relationship between the hypothesized sources and self-efficacy outcomes. In each of the four regression models, mastery experiences, vicarious experiences, social persuasions, and physiological and affective states served as independent variables. Teaching self-efficacy for instructional strategies, teaching self-efficacy for classroom management, and teaching self-efficacy for student engagement were the dependent variables. In the last model, teachers' total self-efficacy score served as the dependent variable. Results of regression analysis, including standardized regression coefficients, structure coefficients, and uniqueness indices, can be found in Table 13.

In the model in which self-efficacy for instructional strategies served as the dependent variable, social persuasions alone predicted self-efficacy and accounted for 5.7% of the variance, $R^2 = .22$, $F(1, 139) = 9.06$, $p < .001$. Mastery experiences accounted for 2.4% of the variance but did not significantly predict self-efficacy. Teachers' vicarious experiences and physiological and affective states were unrelated to their confidence in their ability to develop and execute instructional strategies, accounting for 0.8% and 0.5% of the variance, respectively.

When self-efficacy for classroom management was the dependent variable, none of the hypothesized sources was a significant predictor of teaching self-efficacy, $R^2 = .10$, $F(1, 139) = 3.63$, $p = .008$. However, vicarious experiences accounted for more variance (2.6%) in self-efficacy than did any other source.

In the model in which self-efficacy for student engagement was the dependent variable, social persuasions and physiological and affective states were significant predictors of teaching self-efficacy, accounting for 6.4% and 4.9% of the variance, respectively, $R^2 = .24$, $F(1, 139) = 9.96$, $p < .001$. Vicarious experiences explained only 1.8% of the variance in self-efficacy for student engagement.

When teaching self-efficacy was assessed as a combined score in the final regression model, social persuasions and physiological and affective states significantly predicted self-efficacy, explaining 6.7% and 2.9% of the variance, respectively, $R^2 = .28$, $F(1, 139) = 12.08$, $p < .001$. Mastery experience, although not a significant predictor, had a structure coefficient equivalent in magnitude to that of physiological and affective states. Nevertheless, mastery experience explained 0.1% of the variance in self-efficacy. Vicarious experiences accounted for 2.1% of the variance.

Evidence for the predictive validity of the sources of teaching self-efficacy scale was uneven. Social persuasions and physiological states predicted total teaching self-efficacy and self-efficacy for student engagement. Social persuasions alone predicted self-efficacy for instructional strategies. Neither mastery experiences nor vicarious experiences predicted the self-efficacy outcomes, despite relatively high structure coefficients on some forms of teaching self-efficacy. None of the hypothesized sources predicted teaching self-efficacy for classroom management. These findings appear to

indicate that although the sources of teaching self-efficacy scale shows some predictive validity, further work is needed to expand and refine the scale.

Relationships between the Sources and Teacher Education and Experience

My third objective in this study was to determine whether mean differences existed in the sources of teachers' self-efficacy as a function of teachers' level of education (Bachelor's vs. Master's degree) or years of teaching experience (five years or less vs. more than five years). Results are presented in Table 14. None of the four hypothesized sources varied as a function of teachers' level of education. The mean difference in mastery experiences as a function of education was nonsignificant, F (1, 131) = 3.68, p = .058, d = .35. For vicarious experiences, the test of the main effect of level of education revealed a smaller F-statistic and lower effect size, F (1, 131) = 1.87, p = .174, d = .23. Mean differences in social persuasions were similarly small and nonsignificant, F (1, 131) = 0.23, p = .632, d = .09. The test of the main effect of level of education on physiological and affective states was also nonsignificant, F (1, 131) = 0.43, p = .515, d = .11.

On the other hand, teachers with more than five years of teaching experience had significantly higher mean scores for mastery experiences than did less experienced teachers, F(1, 132) = 9.09, $p < .01$, d = .56. They also had higher mean scores for social persuasions than their less experienced counterparts, F(1, 132) = 23.66, $p < .001$, d = .85. There were no differences in the vicarious experience or physiological and affective states scores of novice and experienced teachers.

Correlations with Teacher Motivation Variables

The fourth objective of this study was to explore the relationships among teaching self-efficacy, its sources, teacher satisfaction, teacher stress, collective teacher efficacy,

optimism, teacher authenticity, and teacher invitations. Results are reported in Table 12. Correlations between the hypothesized sources and the collective teacher efficacy total score, collective efficacy for instructional strategies, and collective efficacy for student discipline were generally weak but significant, ranging from .16 to .29. The correlation between mastery experiences and collective efficacy for student discipline was nonsignificant. All measures of teaching self-efficacy were significantly correlated with measures of collective teacher efficacy with values ranging from .26 to .61.

Teachers' satisfaction was significantly correlated with all measures of teacher self-efficacy and collective teacher efficacy ($.21 \leq r \leq .36$). Teachers' stress, however, was nonsignificantly associated with teachers' sense of personal and collective efficacy, ($-.13 \leq r \leq -.03$). Teacher stress was moderately correlated with physiological and affective states, $r = .43$, $p < .001$, providing some evidence of criterion validity. Teacher satisfaction was negatively associated with physiological and affective states $r = -.56$, $p < .001$. Job satisfaction was not significantly correlated with teacher stress.

Correlations between teaching self-efficacy and positive psychology constructs (i.e., teacher authenticity, optimism, inviting self and inviting others) were generally low or nonsignificant, ranging from .01 to .31. However, self-efficacy for instructional strategies was significantly correlated with all of these variables. Correlations between collective teacher efficacy and the positive psychology constructs were weak or nonsignificant, ranging from .06 to .21. With the exception of vicarious experiences, all hypothesized sources were significantly correlated with optimism, authenticity, and invitations ($|.18| \geq r \leq |.56|$).

Summary

In this chapter I outlined the findings of my study, which involved the validation of a sources of teaching self-efficacy scale and the exploration of other teacher motivation variables. Following an assessment of descriptive statistics and an exploratory factor analysis, 20 items were retained for the final sources of teaching self-efficacy scale. Associations between the four hypothesized sources and teaching self-efficacy were inconsistent, and none of the sources predicted self-efficacy for classroom management. There were no mean differences in the sources as a function of level of education. However, there were significant differences in the valence of novice and experienced teachers' mastery experiences and social persuasions. Teaching self-efficacy was moderately correlated with collective teacher efficacy and teacher satisfaction. Although self-efficacy was weakly correlated with the positive psychology constructs (i.e., optimism, authenticity, and invitations), the hypothesized sources were more highly related to these constructs. In the chapter that follows, I discuss these findings and provide some directions for future research on the sources of teaching self-efficacy.

CHAPTER V

DISCUSSION

The purpose of this study was to examine the validity of a scale designed to assess the sources of teachers' self-efficacy. Four objectives guided the investigation. First, I sought to examine the psychometric properties of items crafted to measure teachers' mastery experiences, vicarious experiences, social persuasions, and physiological and affective states. Second, I aimed to evaluate the independent contribution of each of these sources to the prediction of teacher self-efficacy. The third objective was to determine whether there were mean differences in the hypothesized sources as a function of teachers' levels of experience or education. The final objective was to evaluate associations between teaching self-efficacy, its sources, and other motivation variables. In this chapter, I address each of these objectives in turn. I close by providing some implications of this study for future work in the field, including suggestions for the refinement of the sources scale.

Validity of Sources of Teaching Self-Efficacy Scale

As a whole, results of this study indicate that the present measure of the sources of teaching self-efficacy should be regarded as encouraging though preliminary. In this section, I evaluate evidence for the validity of each of the measures designed to assess the four sources of teaching self-efficacy. I also offer several implications of my findings to future scale development in this area.

Mastery Experiences

The validity of the mastery experiences subscale was not well established in the current study. First, only one of the four mastery experience items was worded positively. Marsh (1996) noted that individuals tend to respond to negative and positive

items in different ways and argued that these response biases may influence researchers' understandings of the relationships between two latent variables. He suggested that multiscale instruments be crafted using only positively-phrased items, or an even number of positive and negative items. It should be noted that this type of response bias is typically less marked for older individuals and for those with more advanced reading ability (Marsh, 1996). Whereas the participants in this study were teachers, the participants in Marsh's (1986, 1992, 1996) studies were students.

In a second phase of the study, however, it may be best to avoid this potential pitfall by refining an initial pool of only positively-worded items. The reliability of the mastery experience items also fell below acceptable standards for scale development (Henson, 2001b). This problem could potentially be rectified in a subsequent phase by including a greater number of items in the initial survey. Including more items in the subscale would also allow the researcher to measure a wider of range of mastery experiences.

In terms of concurrent validity, mastery experiences were moderately correlated with some facets of teacher self-efficacy but failed to predict self-efficacy in a regression that included the other sources. This is somewhat surprising given that mastery experiences are typically the most powerful predictors of self-efficacy (Bandura, 1997). Mastery experiences and teaching self-efficacy were more strongly related in other studies (Poulou, 2007; Tschannen-Moran & Woolfolk Hoy, 2007; Woolfolk Hoy & Burke-Spero, 2005). Associations between the items on the mastery experience subscale and self-efficacy scales could be strengthened by adapting items that have performed well in other studies. For example, the item, "Rate your satisfaction with your professional performance this year" (Woolfolk Hoy & Burke-Spero, 2005), could be written in a

manner more consistent with social cognitive theory (e.g., "I was successful at engaging my students this year").

In teaching, one's mastery is often evaluated through the reflected perceptions of others. This could explain my finding that social persuasions, not mastery experiences, predicted self-efficacy for instructional strategies and for student engagement. In the domain of teaching, evaluations of individuals' past success are often informed by the social messages they receive. In a recent qualitative study, I asked an award-winning professor how he knew that that he was a capable teacher (Morris, 2009). He replied, "I did it. Experience . . . I did it and I learned that I did it well." When asked how he knew that he had done well, however, he simply replied, "They told me I did it well. Students told me. Those who observed me told me that I did it well." It is telling that social persuasion and mastery experience items loaded onto the same factor in the only scale of the sources of teaching self-efficacy published thus far (Poulou, 2007). Indeed, distinctions between social messages and mastery experiences may be artificial in the domain of teaching. Instructors cannot measure their competence, their *efficacy*, using a yardstick or a stopwatch; they must rely instead on their interactions with others to assess whether or not they have achieved their goals.

In the future, researchers may attempt to craft items such that these two sources can be distinguished in meaningful ways. For example, mastery experience items might be phrased in terms of different forms of success (e.g., "At the end of a class, I usually feel that my use of instructional strategies has been successful") whereas social persuasion items could be phrased as general praise (e.g., "My students have told me that I am a good teacher"). Social persuasion items such as, "My students have told me that I have taught them a great deal," should be rewritten so that they do not reflect some type

of success. Another way to distinguish mastery experience from social persuasion items may be to focus on *internal* rather than *external* appraisals. For example, one mastery experience item might be, "I usually succeed at creating an environment in which students exhibit on-task behaviors." Responses to such an item may be informed by social messages, but the participant is ultimately guided to engage in self-evaluation.

Vicarious Experiences

Vicarious experiences were particularly difficult to measure, and some concerns remained about the validity of the subscale. Of the four items that remained after factor analysis, none assessed participants' comparisons with other teachers (i.e., referential comparisons). According to Bandura (1997), referential comparisons serve as a major source of self-efficacy beliefs. Furthermore, vicarious experiences items demonstrated the lowest internal consistency of all the sources subscale items. Vicarious experiences were only weakly correlated with, and not predictive of, teaching self-efficacy outcomes. These results, though underwhelming, are not surprising. In educational contexts, vicarious experience instruments are typically low in reliability and vicarious experiences are the least likely of all hypothesized sources to predict academic self-efficacy, perhaps due to the difficulty of measuring the source (Usher & Pajares, 2008). Researchers investigating the sources of teaching self-efficacy have also found little association between vicarious experiences and teaching self-efficacy (Capa Aydin & Woolfolk Hoy, 2005; Poulou, 2007; Woolfolk Hoy & Burke-Spero, 2005).

It is therefore possible that the weak relationship between vicarious experiences and teaching self-efficacy represents a valid finding. Bandura (1997) maintained that vicarious experiences are most profound when the model is perceived as similar to the individual. Teachers may have few opportunities to observe their peers, who would

likely represent the model similarity Bandura described. As Mulholland and Wallace (2001) noted, inservice teachers often do not watch their colleagues teach, and therefore judge their relative strengths and weaknesses from indirect experiences (e.g., conversations with other teachers). At the preservice level, teachers are typically placed with instructors who have far more experience. Exposure to such models may do little to convince preservice instructors that they have the prerequisite capabilities to teach. Inexperienced teachers may gain confidence by learning the instructional strategies of their mentors (Morris, 2009), but this form of vicarious experience has not been assessed in the quantitative studies to date. In the present study, none of the vicarious experience items was designed to measure strategies gained from observations of master teachers. One item pertained to strategies gained from interactions with peers ("By watching excellent teachers around me, I often learn better ways to approach my own teaching"). However, this item was weakly correlated with teaching self-efficacy, perhaps reflecting the lack of opportunities participants had to observe their colleagues. As I will later discuss, it is important that sources items be crafted to assess the number of times a given experience (e.g., observations of colleagues) occurred.

Another way to improve the scale may be to include more referential comparison items (e.g., "When I compare myself to colleagues, I generally think that I am better at teaching"). Such items were included in the initial pool and tended to be the most highly correlated with measures of self-efficacy. However, these items were not retained because they loaded on the same factor as did mastery experience items. Although Bandura (1997) did not define these sources as mutually exclusive, researchers may consider ways to differentiate items for the purposes of scale construction. Referential comparison items can more easily be distinguished from mastery experience items when

crafted to assess general comparisons rather than comparisons of success. Asking participants to rate, for example, "their own success during the first year compared to other first year teachers in similar situations" (Woolfolk Hoy & Burke-Spero, 2005, p. 350) conflates mastery experiences and referential comparisons. Moreover, it may be difficult for participants to know the degree of success their colleagues have enjoyed.

Social Persuasions

The validity of the social persuasions subscale was supported in several ways. Social persuasions were assessed in appropriately broad terms, as items addressed messages received from students, parents, colleagues, and administrators. Nonetheless, a future subscale might include more examples of implicit, rather than explicit, persuasions (e.g., "I am often asked by others for advice on teaching"). Reliability of the subscale, though better than that of the mastery experience or vicarious experience subscales, was lower than .80 cutoff suggested by Henson (2001b) for general publishing purposes. As previously described, this problem may be rectified by including more items in the subscale.

Correlations between social persuasions and self-efficacy outcomes tended to be moderate. Social persuasions predicted overall teaching self-efficacy as well as self-efficacy for instructional strategies and for student engagement. Of all the hypothesized sources, social persuasions provided the largest unique contribution to these forms of self-efficacy. This finding is consistent with earlier reports that social persuasions have predicted teaching self-efficacy when the other independent variables were mastery experiences, contextual variables, and demographic variables (Tschannen-Moran & Woolfolk Hoy, 2007) or relationships with mentors and teaching experience (Capa Aydin & Woolfolk Hoy, 2005). When combined with mastery experiences, persuasions

predicted teaching self-efficacy in a regression that also included vicarious experiences and physiological and affective states (Poulou, 2007).

Sociologist Charles Horton Cooley (1902) posited that individuals' self-beliefs are a product of their interpersonal interactions. This may be particularly true in the context of teaching, where success is defined by the quality of social interaction. The social messages that inform teacher beliefs may be explicit, as in an administrator's formal observation, but they may also be conveyed in ways as subtle as a student's smile. It may be difficult for researchers to capture the subtle nuances of such implicit messages using quantitative measures. Moreover, some items that assess these implicit messages may be too conceptually similar to mastery experience items because they verge on self-evaluations of success (e.g., "My students' body language usually indicates that they are engaged in the day's lesson"). As previously emphasized, Bandura (1997) conceptualized the hypothesized sources as interrelated factors. However, researchers using quantitative methods will inevitably be faced with the task of defining the sources in distinct ways.

Physiological and Affective States

The physiological and affective states subscale was the longest of the subscales and the most reliable, meeting Henson's (2001b) criteria for publishable results ($\geq .80$). Physiological and affective states were moderately associated with self-efficacy outcomes and predicted teaching self-efficacy for student engagement. These states were moderately associated with teachers' occupational stress, providing further evidence of the measure's validity.

It is difficult to contextualize these findings in pertinent research, as scholars who have focused on the sources of teachers' confidence have largely overlooked the

influence of physiological and affective states. Perhaps this omission reflects the view of some researchers that these states are "most relevant to clinical research" (Labone, 2004, p. 343). Related constructs such as occupational stress and emotional self-regulation have been found to affect teachers' perceptions of efficacy, but few scholars have directly investigated the influence of physiological and affective states. In one of the few studies to do so, physiological and affective states were weakly related to teaching self-efficacy (Poulou, 2007).

The significant relationships reported in this study may support the contention that teachers' physiological and emotional states do indeed influence their perceptions of efficacy. The difference in these findings and those of Poulou (2007) may have to do with the fact that Poulou focused solely on negative emotions and physiological responses. In this study, positive physiological and affective states (e.g., "Teaching puts me in a good mood") were more highly correlated with outcome measures than were negative items. It is important to note that these states had a differential influence on certain aspects of teachers' confidence. It is somewhat intuitive that individuals who feel stimulated by the act of teaching would feel more capable of engaging their students. It is also plausible that no degree of emotional or physiological arousal could convince individuals that they had acquired the strategies to teach effectively. However, it is surprising that experiences reflected in items like "working with difficult students puts me in a bad mood" had no sizeable impact on teachers' self-efficacy for classroom management.

Education, Experience, and the Sources of Teaching Self-Efficacy

I next turn to my examination of how level of education and teaching experience influence the sources of teaching self-efficacy. I found no mean differences in the

hypothesized sources as a function of level of education. That is, teachers who had a Master's degree did not describe their efficacy-relevant experiences any more positively or negatively than did those with a Bachelor's degree. Scholars who have studied the relationship of degree attainment to teaching self-efficacy have varied in their methodologies and have reported mixed results (Chester & Beaudin, 1996; Milner & Woolfolk Hoy, 2003; Ross et al., 1996). Although there is little research with which to compare these findings from the present study, these results are somewhat unexpected. One would hypothesize that the content and skills gained from further education would provide teachers with the tools to succeed (i.e., more positive mastery experiences) in the classroom. Teachers with Master's degrees, particularly with degrees related to teaching, might also have more experiences with instructional models. In this regard, it would have been helpful to have collected information on the types of degrees (i.e., related to teaching or to a specific content area) that participants received. If Master's programs in education do not lead teachers to increased success in the classroom, the utility of such programs may be brought into question. Alternatively, the nonsignificant findings could be an artifact of the small sample size or the measurement difficulties reviewed above.

I also examined mean differences in the hypothesized sources related to teachers' level of experience. As expected, teachers with more than five years of experience reported more positive and less negative mastery experiences than did those with less than five years of experience. I also found that teachers with more experiences reported more positive and fewer negative social persuasions. Novice teachers still honing their craft may be more likely to encounter criticism from students, parents, and administrators. Although these findings appear to show that experienced teachers generally had more positive experiences, they may also reflect a selection bias because

individuals who had negative teaching experiences might be more inclined to leave the profession or to refrain from participating in a study assessing their self-beliefs.

Relationships Among Teacher Motivation Variables

My final analysis involved the examination of correlations between self-efficacy, its sources, and other teaching-related constructs. Teachers' self-efficacy, collective efficacy, and satisfaction were all moderately correlated. These relationships were consistent with Klassen et al.'s (2009, in press) findings and with previous research (e.g., Caprara et al., 2009; Goddard & Goddard, 2001). Teaching self-efficacy was unrelated or weakly related to the three positive psychology variables studied: authenticity, optimism, and invitations. This finding is at odds with research with students for whom positive psychology constructs are associated with perceptions of capability (Pajares, 1994, 2001; Usher, 2006; Usher & Pajares, 2006a). One possibility is that the present finding is an artifact of the relatively small sample size in the study. Another possibility is that the types of adaptive thinking and behavior associated with these positive psychological constructs do not necessarily translate into perceptions of oneself or one's colleagues as competent teachers.

On the other hand, mastery experiences, social persuasions, and physiological and affective states were moderately to highly correlated with teacher authenticity, optimism, and invitations of self. In some cases, the relationships between the hypothesized sources and positive psychology constructs were stronger than those between the sources and self-efficacy. Thus, the experiences represented by items in the sources of teaching self-efficacy scale may also be related to other adaptive self-beliefs and behaviors. Future research can be used to discern whether such experiences serve as antecedents of these other constructs.

Directions for Future Research

In closing, I offer a few thoughts for future research on the sources of teachers' self-efficacy. I begin by discussing the need for item-level analysis of a sources of teaching self-efficacy scale. I then explore the utility of a sources scale composed entirely of positively-worded items. Next, I provide some suggestions for diversifying samples used in scale construction. This is followed by an examination of what constitutes a teacher's *efficacy*, or competency, and of what might be the implications of redefining teacher efficacy for the measurement of self-efficacy and its sources. Finally, I identify three features of sources items and argue that each of these features must be incorporated in a scale of the sources of teaching self-efficacy.

Examining how the sources operate on an item level may be as informative as examining them on a subscale level. As previously discussed, distinctions between hypothesized sources are somewhat artificial in that mastery experiences, vicarious experiences, and social persuasions are often intertwined. Thus, it may in some cases be more useful for researchers and educators to distinguish between the specific events that influence teachers' beliefs. For example, it may be helpful for teacher educators to know whether vicarious experiences with peers or with expert models have a greater influence on preservice teachers' efficacy beliefs. If peers are indeed an important factor in the budding confidence of prospective teachers, professional learning efforts might create more opportunities for these teachers to observe one another.

Another point of emphasis is that the influence of negative events on self-efficacy may not be proportional to the influence of positive events. Bandura (1997) noted, for example, that negative social messages can be more persuasive than positive messages. If only positively phrased items are used in a scale, as suggested by Marsh (1996),

researchers may fail to take into account the full array of events that influence individuals' confidence. Such items may be informative to practitioners who are most concerned with experiences that raise, rather than lower, teachers' self-efficacy.

In the development of a sources scale, researchers should also attend to the diversity of their samples. If teaching self-efficacy does in fact vary in different instructional contexts, so too may the sources of those beliefs. As previously discussed, the experiences of teachers may differ according to their gender, sociocultural background, and ethnic background. Moreover, the sources of teachers' self-efficacy may vary according to the backgrounds of their students. In the present study, participants were mostly White and female, and information on their students was incomplete. To create a scale that is applicable to teachers of various backgrounds and in a variety of contexts, the sample must reflect such a diverse population.

No investigation of the sources of teachers' self-efficacy is complete without consideration of teachers' *efficacy*, or competency. Tschannen-Moran and Woolfolk Hoy's (2001) Teacher Sense of Efficacy Scale centers on three competencies: the ability to utilize different instructional strategies, the ability to manage a class effectively, and the ability to engage students. Researchers must ask if there are additional competencies that teachers consider in evaluating their capabilities. For example, no items on the scale pertain to teachers' abilities as mentors or advocates. According to an award-winning professor in my earlier qualitative study, teaching is "not just giving information about a subject matter; it's teaching the whole person and making that person better in some way" (Morris, 2009, p. 48). That is, the role of the teacher is not confined to the classroom. Instructors may judge their competencies according to their ability to have a positive and lasting influence on their students' lives. In addition, scholars like Siwatu

(2007) have explored teachers' perceived capability to enact culturally responsive pedagogy in their classrooms.

In essence, different teachers may reflect on different competencies as they form their beliefs, and these varied approaches have implications for the measure of teaching self-efficacy in general. At the core of teachers' general self-efficacy is the evaluation of what it means to be an effective teacher. Whereas one individual may define the role of the teacher as that of a mentor and an advocate, another may define teaching as the ability to communicate a wealth of content knowledge. More likely, teachers reflect on several aspects of the teaching task but place more value on some than others. General teaching self-efficacy was measured in this study as the combination of self-efficacy for instructional strategies, for classroom management, and for student engagement. The drawback of this approach is that it assumes that teachers value these three capabilities equally and exclusively, and that there are other ways of conceptualizing self-efficacy that include culturally responsive pedagogy in diverse settings. A better approach may be to assess general teaching self-efficacy using items in which competence is defined by the respondent rather than imposed by the measure (e.g., "I can teach very well"). Such a measure could also be used to evaluate the validity of the TSES as a measure of general teaching self-efficacy.

When teacher competence is defined for the respondent, measures of the sources of teaching self-efficacy should be designed accordingly. In the current study, none of the hypothesized sources predicted self-efficacy for classroom management. This problem could be rectified in the future by adapting some items for pertinence to classroom management. For example, a mastery experience related to classroom management might be, "I have been successful at minimizing class disruptions due to

student misbehavior." That is, different sources items would have better predictive validity if they were crafted for relevance to different forms of self-efficacy. A lack of correspondence between sources items and self-efficacy items may undermine the interpretability of findings. In this study, it was not clear if the weak association between the four hypothesized sources and self-efficacy for classroom management was due to the ways in which the sources were measured or due to the poor correspondence between sources and self-efficacy items.

Researchers who wish to explore the sources of teaching self-efficacy must consider both the *quality* and the *quantity* of individuals' experiences. Bandura (1997) posited that self-efficacy is influenced not only by quality of an event (e.g., positive or negative, profound or mild), but also by the number of times an individual experiences such an event. For example, teachers may become more confident from their observations of other teachers, but if opportunities to watch their colleagues are limited, so too may be the influence of these vicarious experiences on teaching self-efficacy. In some studies, the sources have been assessed only in terms of the frequency (i.e., quantity) of an event, as in measuring mastery experiences merely as the amount of teaching experience one has (e.g., Cantrell, Young, & Moore, 2003; Capa Aydin & Woolfolk Hoy, 2005; Gurvitch & Metzler, 2009). More often, researchers have focused exclusively on the quality of an experience, as in measuring mastery experiences as teachers' satisfaction with their professional performances (e.g., Tschannen-Moran & Woolfolk-Hoy, 2007**;** Woolfolk Hoy & Burke-Spero, 2005). In the present study, most of the initial sources items emphasized the quality rather than quantity of an experience. When it is unclear if an item pertains to the quantity or quality of an experience, participants can potentially interpret the item in different ways. For example, when asked

to rate the interpersonal support they receive, some teachers may consider how much support they have received, and others may consider the extent to which support was positive.

In addition to quality and quantity, *construal biases* can also influence the relationship between capability-related events and self-efficacy. Bandura (1997) contended that "information that is relevant for judging personal capabilities – whether conveyed enactively, vicariously, persuasively, or physiologically – is not inherently enlightening. It becomes instructive only through cognitive processing of efficacy information and through reflective thought" (p. 79). To understand the factors that contribute to self-efficacy development, researchers must identify not only important events in individuals' lives but also the ways that individuals reflect on their experiences. Whereas quality and quantity serve as characteristics of a source, construal refers to the way the actor makes meaning and assigns importance to that source. Judging an experience as a success (quality of a mastery experience) requires some level of interpretation. However, if individuals construe a success to be insignificant due to external factors (e.g., task demands, situational variation), the experience may have little impact on their self-efficacy. In other words, construal mediates the relationship of a source to perceptions of efficacy. Items crafted to assess construal relate a general interpretive bias to a given source, as in the item, "When people I respect tell me I will be a good teacher, I tend to believe them" (Kieffer & Henson, 2000). Perhaps the development of self-efficacy is mediated by individuals' interpretive tendencies and habits of mind.

Items that measure the quality, quantity, or construal of the sources are conceptually distinct, and each aspect is important to consider in the prediction of self-

efficacy. To measure quality without quantity would be to overlook the potential additive effect of multiple experiences. To measure quantity without quality would be to ignore the possibility that certain types of experiences are more profound and memorable than others. Although construal biases are not sources of self-efficacy, a measure of these biases could be used to complement the sources in the prediction of teaching self-efficacy. To date, no researchers have regressed self-efficacy on variables related to the quality, quantity, and construal of the hypothesized sources. Examining the relative influence of these three factors on self-efficacy could provide valuable insights into how this important belief develops.

It is no easy task to define and measure something as elusive as the sources of individuals' beliefs. Although the present study represents an encouraging step in the development of a sources of teaching self-efficacy scale, it also produces many questions to which there are no ready answers. For example, how does one create a scale that is sensitive to issues of quantity, quality, and construal bias but that is also relevant to various types of teaching self-efficacy? Moreover, what tools would researchers use in the validation of such a scale? The future of research on the sources of teaching self-efficacy is uncertain, but the need for such research has become clear. In learning what events shape teachers' self-efficacy beliefs, scholars and teacher educators can gain valuable insights into ways to improve a belief that influences the motivation and behaviors of both teachers and their students.

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Tables

Table 1

Review of Findings from Investigations of the Sources of Teaching Self-Efficacy

Authors	Participants	Methodology	Relevant Findings	Self-Efficacy Measure
Burton, Bamberry, & Harris-Boundy (2005)	54 entering PhD students in various fields (United States)	Quantitative	Individuals who attended a teaching effectiveness workshop aimed at providing mastery experiences, social persuasions, vicarious experiences, and physiological and affective states had higher levels of teaching self-efficacy than did individuals who did not attend.	Gibson and Dembo's (1984) TES
Capa Aydin & Woolfolk Hoy (2005)	70 preservice teachers of various subjects at various grade levels (United States)	Quantitative	Participants' number of field experiences (mastery experiences), their relationships with mentors (vicarious experience), and the teaching support they received (social persuasions) predicted their teaching self-efficacy.	Tschannen-Moran and Woolfolk Hoy's (2001) TSES
Chacon (2005)	100 middle school English teachers (Venezuela)	Quantitative	Staff development (mastery experiences) was related to teachers' self-efficacy for student engagement and instructional strategies but not to classroom management.	Tschannen-Moran and Woolfolk Hoy's (2001) TSES
Heppner (1994)	5 graduate psychology instructors	Mixed Methods	Participants most often recalled the influence of social persuasions on their teaching self-efficacy. They ranked mastery experiences as having the most critical impact on their sense of efficacy, followed by social persuasions, vicarious experiences, and physiological states.	Single rating scale item
Milner & Woolfolk Hoy (2003)	1 high school English teacher (United States)	Qualitative	The sources of teaching self-efficacy may take on different characteristics in settings perceived to be prejudicial. For example, stereotypes functioned as social persuasions, and successfully combating stereotypes served as a mastery experience.	Unknown

Authors	Participants	Methodology	Relevant Findings	Self-Efficacy Measure
Morris (2009)	12 award-winning professors in various fields (United States)	Qualitative	Mastery experiences and social persuasions were critical to professors' self-efficacy development, but the hypothesized sources were often interrelated. The influence of the sources was especially profound at the earliest stages of their teaching careers.	Semi-structured interview question
Mulholland & Wallace (2001)	1 novice elementary science teacher (United States)	Qualitative	Mastery experiences and social persuasions are the most critical sources. Vicarious experiences tended to lower the participant's sense of efficacy.	None
Palmer (2006a)	55 preservice elementary science teachers (Australia)	Mixed Methods	Preservice teachers enrolled in a science methods course that enhanced their self-efficacy. Having the opportunity to teach and seeing that students enjoyed a lesson served as powerful mastery experiences.	Enochs and Rigg's (1990) STEBI-B
Palmer (2006b)	190 preservice elementary science teachers (Australia)	Mixed Methods	A science methods course increased participants' self-efficacy. Imagining one's self teaching (vicarious experience) and knowing the content and how to teach it (mastery experiences) were the most commonly reported sources.	Enochs and Rigg's (1990) STEBI-B
Poulou (2007)	198 preservice elementary teachers of various subjects (Greece)	Quantitative; scale development	Mastery experiences, vicarious experiences, and social persuasions correlated with all subscales of the self-efficacy scale. Physiological and affective states were related to teachers' self-efficacy for student engagement, but not to their self-efficacy for instructional strategy use or classroom management.	Tschannen-Moran and Woolfolk Hoy's (2001) TSES (translated into Greek)

Authors	Participants	Methodology	Relevant Findings	Self-Efficacy Measure
Prieto & Meyers (1999)	166 graduate psychology teaching assistants (United States)	Quantitative	Formal training and supervision had a positive influence on teaching assistants' self-efficacy. However, the types of mastery experiences, vicarious experiences, social persuasions, and emotional states associated with training varied according to each department's approach.	Prieto & Altmaier's (1994) SETI-A
Ross & Bruce (2007)	106 sixth-grade teachers of various subjects (Canada)	Quantitative	Professional development designed to provide positive sources of teaching self-efficacy enhanced teachers' self-efficacy for classroom management. Changes in self-efficacy for student engagement and for instructional strategies were positive but nonsignificant.	Tschannen-Moran and Woolfolk Hoy's (2001) TSES
Tschannen-Moran & McMaster (2009)	93 K-2 and resource teachers (United States)	Quantitative	Four professional development interventions designed to target different hypothesized sources did not differ in their prediction of general teaching self-efficacy. However, a treatment in which teachers were coached in the target strategy enhanced reading instruction self-efficacy and implementation the strategy.	Tschannen-Moran and Woolfolk Hoy's (2001) TSES
Tschannen-Moran & Woolfolk Hoy (2007)	74 novice teachers 181 experienced teachers (United States)	Quantitative	Correlations between social persuasions and self-efficacy were nonsignificant for novice teachers and weak for experienced teachers. Mastery experiences were moderately correlated with teaching self-efficacy for both novice and experienced teachers.	Tschannen-Moran and Woolfolk Hoy's (2001) TSES
Weaver Shearn (2008)	252 first-year teachers in various grade levels and subject areas (United States)	Quantitative; scale development	Mastery experiences and physiological and affective states were moderately correlated with teaching self-efficacy. Vicarious experiences and social persuasions correlated weakly but significantly with teaching self-efficacy. Regression analysis revealed that all sources contributed to the prediction of self-efficacy.	Tschannen-Moran and Woolfolk Hoy's (2001) TSES
Woolfolk Hoy & Burke-Spero (2005)	29 first-year teachers in various grade levels and subject areas (United States)	Quantitative	When measured as success in their first year compared to that of other first year teachers, mastery experiences did not predict teaching self-efficacy. When measured as satisfaction with professional performance in the first year, mastery experiences correlated with some, but not all, measures of teaching self-efficacy.	Tschannen-Moran and Woolfolk Hoy's (2001) TSES; Gibson and Dembo's (1984) TES; Bandura's (2006) TSES

Table 2

Sample Items and Qualitative Prompts from Studies of the Four Sources of Teachers' Self-Efficacy

Mastery Experience • Rate your satisfaction with your professional performance this year. (Woolfolk Hoy & Spero, 2005) • Rate your success during the first year compared to other first year teachers in similar situations. (Woolfolk Hoy & Spero, 2005) • I have had many positive opportunities to teach. (Keiffer & Henson, 2000) • [Rate the influence on your self-efficacy beliefs of] actual mastery experiences as a teacher (Heppner, 1994). • What experiences in your professional life as a teacher have made you more confident/lowered your confidence as a teacher of undergraduates? (Morris, 2009)
Vicarious Experience • Comparison of your teaching with that of your colleagues. (Poulou, 2007) • Comparison of your teaching with the model teaching you observe during teaching practice. (Poulou, 2007) • My classroom observations are valuable to me. (Keiffer & Henson, 2000) • [To what extent does your mentoring teacher] share her/his own struggles and frustrations and how she/he overcame them? (Capa Aydin & Woolfolk Hoy, 2005) • According to the theory explored in this study, there are many vicarious influences on the confidence we have in our teaching. These may include things we've seen, things we've read, or others we have observed. Can you pinpoint some powerful vicarious influences on your teaching confidence? (Morris, 2009)
Social Persuasions • Rate the interpersonal support provided by your colleagues at your school. (Tschannen-Moran & Woolfolk Hoy, 2007) • The feedback I receive from others does not help me teach better. (Keiffer & Henson, 2000) • [Rate the influence on your self-efficacy beliefs of] significant people in your life persuading you about your skillfulness as a teacher. (Heppner, 1994) • Rate the benefit you received from collaborating with your campus colleagues. (Weaver Shearn, 2008) • Received feedback that their teaching was successful (Palmer, 2006b)
Physiological/Affective States • Feelings of stress or anxiety during your teaching sessions. (Poulou, 2007) • Recovery of negative feelings during your teaching sessions. (Poulou, 2007) • When I say the wrong things to a class, I become anxious. (Keiffer & Henson, 2000) • [Rate the influence on your self-efficacy beliefs of] information you obtain from your body that might include nervousness, tension or calm while teaching. (Heppner, 1994) • Identify some of the most prominent feelings and emotions that you experience when you are teaching and when you are preparing to teach. Which of these feelings or emotions would you say have raised/decreased your confidence for teaching undergraduates? (Morris, 2009)

Table 3

Participants' Reported Background and Teaching Context

	n	%
Participant Ethnicity		
White	115	83%
Black or African American	18	13%
Hispanic	2	1%
Asian	1	1%
Mixed ethnic origin	2	1%
Participant Age		
20-29	41	30%
30-39	40	29%
40-49	20	14%
50 or older	37	27%
Participant Education (Highest Degree)		
Bachelor's	57	42%
Master's	72	53%
Specialist	8	6%
Participant Teaching Experience		
Less than 10 years	69	50%
10-20 years	40	29%
More than 20 years	29	21%
Number of Years at Current School		
5 years or less	86	62%
6-10 years	31	22%
Over 10 years	21	15%
Participant Subject Area		
Mathematics	21	15%
Language Arts	6	4%
Social Studies	5	4%
Science	3	2%
Foreign Language	13	9%
Other	8	6%
Number of Subjects Taught by Participant		
All core subjects	60	43%
Mathematics and science	12	9%
Language arts and social studies	5	4%
Some other combination of subjects	5	4%
School Type		
Elementary	76	55%
Middle	59	43%
Combined Elementary and Middle	3	2%
Student Socioeconomic Status		
Low to average SES	9	7%
Average SES	34	25%
Average to high SES	95	69%

Table 4

Schools and Students: Descriptive Statistics

	District 1						Independent		District 2					
	School 1: Public Elementary		School 2: Public Elementary		School 3: Public Elementary		School 4: Private P-12*		School 5: Public Middle		School 6: Public Middle		School 7: Public Middle	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Participants who Taught in School	20	14%	13	9%	8	6%	4	2%	24	17%	34	24%	7	5%
Gender of Students														
Male	389	48%	413	52%	219	48%	388	46%	417	50%	613	47%	526	53%
Female	427	52%	387	48%	238	52%	453	54%	409	50%	682	53%	461	47%
Ethnicity of Students														
White	535	81%	569	81%	131	33%	631	75%	576	69%	757	66%	15	1%
African American	51	8%	64	9%	149	37%	90	11%	157	19%	126	11%	1093	97%
Hispanic	50	8%	28	4%	89	22%	40	5%	61	7%	46	4%	10	1%
Asian	17	3%	24	3%	21	5%	30	4%	21	3%	168	15%	3	0%
American Indian	1	0%	0	0%	0	0%	0	0%	1	0%	2	0%	0	0%
Unspecified	0	0%	17	2%	12	3%	55	7%	24	3%	43	4%	10	1%
Students eligible for free or discounted lunch	52	8%	55	8%	144	36%	N/A	N/A	151	18%	85	7%	624	55%

Note. Because survey data were collected in the 2005-2006 school year, all student statistics are based on enrollments for the year 2005, except where noted (*). Student statistics for School Four were based on enrollments for the year 2004, as data on enrollments for 2005 were missing

Table 5

Expected Correlations Between the Hypothesized Sources, Teacher Self-Efficacy, and Related Teacher Motivation Variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Teaching Self-Efficacy											
2. Mastery Experiences	+										
3. Vicarious Experiences	+	+									
4.Social Persuasions	+	+	+								
5.Physiological States	-	-	-	-							
6.Teacher Satisfaction	+	+	+	+	-						
7.Teacher Stress	-	+	+	+	+	-					
8. Collective Efficacy	+	+	+	+	-	+	-				
9. Optimism	+	+	+	+	-	?	-	+			
10. Teacher Authenticity	+	+	+	+	-	?	-	?	+		
11. Invitations of Self	+	+	+	+	-	?	?	?	+	?	
12. Invitations of Others	+	+	+	+	-	?	?	?	+	?	+

Table 6

Descriptive Statistics for Teacher Motivation Scales

Item	*M*	*SD*	*r-total*
Teaching Self-Efficacy for Instructional Strategies $\alpha = .76$			
ISE1: How much can you do to craft good questions for students?	8.06	0.98	.44
ISE2: How much can you do to implement a variety of assessment strategies?	7.85	1.18	.58
ISE3: How much can you do to provide an alternative explanation when students are confused?	8.01	1.03	.55
ISE4: How much can you do to implement alternative strategies in your classroom?	7.65	7.65	.69
Teaching Self-Efficacy for Classroom Management $\alpha = .87$			
MSE1: How much can you do to control disruptive behavior in the classroom?	7.43	1.23	.73
MSE2: How much can you do to get children to follow classroom rules?	7.71	1.12	.78
MSE3: How much can you do to calm a student who is disruptive or noisy?	7.47	1.19	.74
MSE4: How much can you do to establish a classroom management system with each group of students?	7.94	1.01	.68
Teaching Self-Efficacy for Student Engagement $\alpha = .82$			
ESE1: How much can you do to motivate students who show low interest in school work?	7.04	1.38	.64
ESE2: How much can you do to get students to believe they can do well in school work?	7.47	1.19	.77
ESE3: How much can you do to help students value learning?	7.20	1.40	.66
ESE4: How much can you do to assist families in helping their children do well in school?	6.72	1.38	.48

Item	*M*	*SD*	*r-total*
Teacher Satisfaction α = .87			
JOBSAT1: I am satisfied with my job.	7.07	1.69	.79
JOBSAT2: I am happy with the way my colleagues and supervisors treat me.	7.20	1.60	.66
JOBSAT3: I am satisfied with what I achieve at work.	7.38	1.32	.55
JOBSAT4: I feel good at work.	7.32	1.41	.74
JOBSAT5: I am satisfied with teaching in my current location.	7.35	1.90	.70
Teacher Stress			
STRESS: I find teaching to be very stressful.	6.27	2.35	N/A
Collective Teacher Efficacy for Instructional Strategies α = .85			
CEIS1: How much can teachers in your school do to produced meaningful student learning?	8.02	0.93	.56
CEIS2: How much can your school do to get students to believe they can do well in schoolwork?	7.67	1.06	.65
CEIS3: How much can teachers in your school do to help students master complex content?	7.63	0.92	.74
CEIS4: How much can teachers in your school do to promote deep understanding of academic concepts?	7.69	0.96	.67
CEIS5: How much can teachers in your school do to help students think critically?	7.69	1.12	.69
CEIS6: How much can your school do to foster student creativity?	7.71	1.12	.50
Collective Teacher Efficacy for Student Discipline α = .80			
CESD1: To what extent can teachers in your school get students to believe they can do well in schoolwork?	8.17	0.94	.59
CESD2: To what extent can school personnel in your school establish rules and procedures that facilitate learning?	7.91	1.11	.55
CESD3: How well can teachers in your school respond to defiant students?	7.04	1.35	.65

Item	*M*	*SD*	*r-total*
Collective Teacher Efficacy for Student Discipline (cont.) α = .80			
CESD4: How much can school personnel in your school do to control disruptive behavior?	7.10	1.53	.57
CESD5: How well can adults in your school get students to follow school rules?	7.31	1.27	.67
CESD6: How much can your school do to help students feel safe while they are at school?	8.30	0.83	.36
Invitations of Self α = .89			
IS1:I am quick to recognize my own value as a teacher.	7.17	1.50	.70
IS2: I plan time for enjoyable activities that I can do on my own.	7.24	1.78	.58
IS3: I congratulate myself on my teaching successes.	6.88	1.81	.77
IS4: I pay attention to my own needs.	6.53	1.84	.67
IS5: I forgive myself for my mistakes in teaching.	6.81	1.50	.70
IS6: I am impressed with my own teaching abilities.	6.91	1.55	.79
Invitations of Others α = .73			
IO1: I like to include others in the activities in my classroom.	6.78	1.70	.31
IO2: I try not to be critical of the people with whom I work.	7.15	1.68	.36
IO3: I congratulate my colleagues on their successes.	8.23	0.94	.53
IO4: I forgive my colleagues for their mistakes.	7.75	1.13	.55
IO5: I am impressed with the abilities of others with whom I work.	7.98	1.18	.48
IO6: I am quick to recognize the value of others with whom I work.	8.07	0.94	.59
Optimism α = .89			
OPT1: When I'm not sure what is going to happen, I usually expect that the best possible thing will happen.	6.31	1.68	.57
OPT2: If something can go wrong for me, it will. *	6.48	1.94	.61
OPT3: I always look on the bright side of things.	6.88	1.42	.63
OPT4: I hardly ever expect things to go my way. *	7.08	1.65	.64

Item	*M*	*SD*	*r-total*
Optimism (cont.) α = .89			
OPT5: I'm always optimistic about my future.	7.01	1.49	.73
OPT6: Things never work out the way I want them to. *	7.46	1.42	.72
OPT7: I feel confident that I will succeed in the future.	7.82	1.25	.63
OPT8: Good things never happen to me. *	8.10	1.24	.55
OPT9: Most things in life have a happy ending.	6.64	1.61	.33
OPT10: When I'm not sure what is going to happen, I usually expect that the worst possible thing will happen. *	7.08	1.90	.63
OPT11: Things usually work out the way I want them to.	6.61	1.46	.52
OPT12: If something *can* go wrong for me, it *will* go wrong. *	7.57	1.60	.62
Teacher Authenticity α = .85			
AUTH1: Sometimes I'm afraid other people will discover I'm not a very good teacher. *	7.17	2.13	.74
AUTH2: I believe that I deserve whatever praise and recognition I receive for my teaching.	7.04	1.73	.33
AUTH3: Sometimes I'm afraid that other people think I'm a better teacher than I really am. *	6.64	2.39	.76
AUTH4: When someone compliments me for my teaching, I usually feel I don't deserve the compliment. *	7.07	2.09	.66
AUTH5: I'm afraid that other people important to me may find out I'm not as competent a teacher as they think I am. *	7.34	2.07	.83
AUTH6: When I teach well, it's usually out of luck. *	8.12	1.31	.52

Note. *r*-total = item correlation with scale total. α = Cronbach alpha for scale. Statistics in **bold** were deemed beyond a desirable range.

* This item was reverse scored.

Table 7

Descriptive Statistics for Initial Items in Sources of Teaching Self-Efficacy Scale

Item	*M*	*SD*	Skew	Kurt	r-total	ESE	MSE	ISE	TSE
Mastery Experiences α = .71									
ME1: I am good at teaching.	7.86	1.10	-1.4	4.4	.62	.37	.22	.34	.39
ME2: I have always been good at teaching.	6.88	1.82	-1.0	1.1	.51	.30	**.02**	.27	.32
ME3: I teach very well.	7.26	1.34	-1.1	2.6	.58	.23	**.19**	.43	.34
ME4: My last teaching evaluation was excellent.	8.40	0.88	-1.7	3.0	.32	**.15**	**.14**	.26	.23
ME5: I usually do a poor job covering new material with students. *	7.73	1.70	-1.7	1.9	.38	**.12**	**.08**	**.18**	**.15**
ME6: When a particular lesson is difficult for me to teach, I just put more effort into it.	7.91	1.35	-2.3	7.6	.31	.29	**.12**	.42	.34
ME7: When I do poorly teaching a particular concept, I just try harder next time.	7.96	1.18	-1.7	4.9	.37	.26	.20	.35	.34
ME8: I do not feel as though I have developed enough strategies to perform my job well. *	6.97	2.27	-1.1	0.0	.51	**.18**	**.09**	.25	.22
ME9: I have succeeded at getting through to even the most difficult students.	7.06	1.56	-0.9	0.5	.41	.44	.21	.44	.46
ME10: I need a good deal of help to succeed as a teacher. *	6.96	1.98	-0.8	-0.3	.37	**.13**	**.11**	.25	.20
ME11: I don't have to put forth a lot of effort to teach well.	4.39	2.27	0.2	-0.9	**.05**	**.03**	**.04**	**.09**	**.06**
ME12: Even when I plan for hours, I don't teach very effectively. *	8.28	1.08	-2.4	7.1	.43	.20	**.18**	.29	.27
ME13: Although I have sometimes had difficulty with teaching, in general I've been getting better at it.	6.22	2.52	-0.9	-0.3	**-.24**	**-.18**	**.02**	**-.18**	**-.16**
ME14: I'm never going to get much better at teaching than I am right now.	2.26	2.01	1.9	2.9	**-.04**	**-.14**	**.05**	**.15**	**.14**
ME15: I often think about my past lessons that have gone particularly well.	6.57	2.30	-1.1	0.4	**.19**	**.17**	.20	**.09**	.20

Item	*M*	*SD*	Skew	Kurt	r-total	ESE	MSE	ISE	TSE
Vicarious Experiences α = .65									
VE1: I'll never teach as well as the best teachers in my school. *	7.24	2.13	-1.3	1.0	.32	**.16**	**.19**	.39	.29
VE2: I had an excellent teaching model when I began teaching.	6.14	2.76	-0.7	-0.9	**.18**	.23	**.09**	.20	.22
VE3: My students usually do better than other teachers' students	5.84	1.70	-0.6	0.8	**.05**	.23	**.18**	**.05**	.20
VE4: I have close family members who were/are educators.	5.76	3.61	-0.4	-1.7	**.13**	**.01**	**-.03**	**-.01**	**-.01**
VE5: I have role models who are teachers.	7.49	2.38	-1.7	1.7	**.23**	**.19**	**-.02**	**.16**	**.14**
VE6: I am one of the most competent teachers at my school.	6.55	1.95	-0.7	0.0	.31	**.18**	.22	.38	.32
VE7: By watching excellent teachers around me, I often learn better ways to approach my own teaching.	8.18	1.22	-2.4	7.0	**.29**	**.11**	**.10**	**.19**	**.16**
VE8: Most of the teachers with whom I work closely are confident in their teaching abilities.	7.73	1.06	-0.8	0.4	**.18**	**.05**	**.13**	**.14**	**.13**
VE9: Compared to other elementary school teachers, I am quite good at teaching.	7.73	1.36	-0.3	-0.9	.34	.29	.23	.34	.36
VE10: Most of the teachers I work with are better than me. *	6.87	2.02	-0.7	-0.4	**.22**	.26	.23	.33	.34
VE11: My colleagues help make challenging teaching problems seem more manageable.	7.12	1.61	-1.2	1.8	.37	**.09**	**.16**	**.19**	**.18**
VE12: I often try to visualize myself working through the most difficult teaching situations.	5.35	2.38	-0.3	-1.0	.30	**.12**	**.12**	**.15**	**.16**
VE13: Seeing others teach better than me pushes me to do better.	7.07	1.83	-1.4	2.1	**.15**	**.08**	**.09**	**-.04**	**.06**
VE14: I often think or talk through difficult teaching problems I might encounter.	6.49	2.35	-1.0	0.1	.33	.23	.27	**.19**	.29
VE15: Compared to other teachers, it takes me a lot longer to prepare lessons and handle my duties. *	7.12	2.25	-1.1	0.1	**.12**	**.04**	**.07**	.21	**.12**
VE16: Most people I respect in life are those who are good teachers.	5.81	2.43	-0.5	-0.7	.43	**.14**	**.02**	**.00**	**.07**

Item	*M*	*SD*	Skew	Kurt	r-total	ESE	MSE	ISE	TSE
Social Persuasions α = .71									
SP1: People I respect believe that I can succeed as a teacher.	8.26	1.04	-2.8	**16.0**	**.21**	**.13**	**.10**	**.18**	**.17**
SP2: People have told me that I'm successful in the classroom because I work hard.	7.71	1.10	-0.8	0.2	.42	.36	**.17**	.31	.35
SP3: People have told me that I may not have what it takes to be a good teacher. *	8.62	1.14	**-4.9**	**27.6**	**.06**	**.02**	.21	**.16**	**.14**
SP4: My family members have often told me that I am a good teacher.	7.74	1.68	-2.1	5.5	**.21**	.21	**.05**	.22	.21
SP5: People criticize my teaching. *	8.18	1.25	-2.5	7.7	**.15**	**.10**	**.07**	.21	**.15**
SP6: I have been recognized for excellence in teaching.	6.74	2.33	-1.0	0.2	.45	.35	.24	.42	.42
SP7: Most of my students' parents believe I'm a good teacher.	7.82	1.08	-1.0	1.0	**.25**	.32	**.17**	.30	.33
SP8: The administrators at my school compare me to other teachers.	4.71	2.46	0.0	-1.1	.30	**.17**	**.15**	**.13**	**.19**
SP9: My students have told me that I have taught them a great deal.	7.51	1.34	-1.1	1.8	.46	**.18**	**.08**	**.18**	**.19**
SP10: People have told me that I'm successful in the classroom because I work hard.	7.08	1.77	-1.1	1.1	.45	.26	**-.02**	**.01**	**.12**
SP11: People often point out how much progress I've made as a teacher.	5.43	2.46	-0.3	-0.9	.37	**.16**	**.01**	**.04**	**.09**
SP12: My administrators and colleagues have told me that I am a good teacher.	7.97	1.33	-2.5	8.3	.59	.30	**.11**	.41	.34
SP13: I have been told that I should consider applying for National Board Certification.	5.23	3.27	-0.2	-1.7	**.21**	.21	**.13**	.24	.24
SP14: My colleagues provide me with constructive criticism that helps me improve my teaching.	5.16	2.44	-0.2	-1.1	**.25**	**.13**	**.09**	**.00**	**.02**
SP15: The administrators at my school are happy with my teaching performance as long as I am making improvements.	7.18	1.84	-1.3	1.5	**.21**	**.03**	**.11**	**.07**	**.06**

Item	*M*	*SD*	Skew	Kurt	r-total	ESE	MSE	ISE	TSE
Physiological and Affective States α = .82									
PA1: I start to feel stressed whenever I think about teaching.	2.58	1.87	1.2	0.3	.57	**.18**	**.13**	.22	.22
PA2: I feel relaxed when I am teaching. *	3.09	1.72	1.1	1.3	.59	.29	.24	.35	.24
PA3: When I prepare to teach a tough lesson, I often remind myself that I have done well teaching tough lessons before.	6.72	1.80	-1.0	1.1	**.01**	.29	**.03**	.25	.24
PA4: Teaching is stimulating for me. *	2.19	1.35	1.6	3.5	.34	.36	.21	.27	.35
PA5: Before I am observed, I can feel my heart pounding or I get a stomach ache.	4.57	2.72	0.2	-1.3	.45	**.10**	**.14**	**.15**	**.15**
PA6: I often think about what an ineffective teacher I am.	2.33	1.93	1.7	1.7	.39	**.17**	**.09**	.22	.20
PA7: Working with difficult students puts me in a bad mood.	4.51	2.34	0.1	-1.1	.40	**.19**	**.11**	**.14**	**.19**
PA8: I tend to get depressed when I think about going to school.	2.74	1.99	1.0	-0.1	.50	**.17**	**.13**	**.09**	**.17**
PA9: When I have to teach new concepts, I feel nervous.	3.49	2.17	0.6	-0.7	.43	**.01**	**.12**	.23	**.13**
PA10: Teaching puts me in a good mood. *	2.99	1.51	0.6	0.0	.54	.43	.21	.28	.39
PA11: Just entering the school building makes me feel stressful and nervous.	2.30	1.74	1.5	1.8	.64	**.17**	**.15**	.23	.22
PA12: My whole body becomes tense when I have to present difficult concepts to my students.	1.91	1.59	2.7	8.5	.38	**.18**	**.10**	.21	.20
PA13: Just thinking about doing lesson plans makes me feel nervous.	2.26	1.97	1.9	3.0	.40	**.07**	**.00**	**.16**	**.09**
PA14: Teaching makes me exhausted.	5.49	2.58	-0.3	-1.1	.52	.20	**.01**	.20	**.16**
PA15: I look forward to going to work each day. *	3.26	2.03	0.8	0.0	.52	.29	**.13**	**.15**	.24

Note. *r*-total = item correlation with all items designed to assess the same source of self-efficacy. α = Cronbach's alpha for all items designed to assess a given source. ESE = Teaching self-efficacy for student engagement. MSE = Teaching self-efficacy for classroom management. ISE = Teaching self-efficacy for instructional strategies. TSE = Teaching self-efficacy (total score). Statistics in **bold** were had values that exceeded a desirable range.

* This item was reverse scored.

Table 8

Criteria Used to Eliminate Items on Sources of Teaching Self-Efficacy Scale

Item	Wording	High Skew	High Kurtosis	Low item-total r	Low r with outcome measures	Problematic factor loading
Eliminated Before Factor Analysis						
ME1	X					
ME3	X			X	X	
ME10				X		
ME11				X	X	
ME13				X	X	
ME14				X	X	
VE3				X	X	
VE4				X	X	
VE8				X	X	
VE13				X	X	
VE15				X	X	
SP1			X	X	X	
SP3		X	X	X	X	
SP5				X	X	
SP10					X	
SP11					X	
SP14				X	X	
SP15				X	X	
PA3				X	X	
PA9					X	
PA13					X	
Eliminated During Factor Analysis						
ME4					X	X
ME6					X	X
ME7						X
ME9						X
ME15				X	X	X
VE1					X	X
VE2				X	X	X
VE5				X	X	X
VE6					X	X
VE9						X
VE10				X		X
VE16					X	X
SP2					X	X
SP6						X
SP8					X	X
SP13				X	X	X
PA1					X	X
PA5					X	X
PA6					X	X
PA12					X	X

Table 9

Factor Loadings and Communalities for Items in the Final Sources of Teaching Self-Efficacy Scale

Item	Factor 1	Factor 2	Factor 3	Factor 4	Com
Mastery Experiences α = .66					
ME2: I have always been good at teaching.	-.09	.18	.18	**.45**	.37
ME5: I usually do a poor job covering new material with students.*	.11	-.07	.04	**.82**	.61
ME8: I do not feel as though I have developed enough strategies to perform my job well.*	-.23	.06	.05	**.60**	.52
ME12: Even when I plan for hours, I don't teach very effectively.*	.05	.35	-.10	**.55**	.52
Vicarious Experiences α = .63					
VE7: By watching excellent teachers around me, I often learn better ways to approach my own teaching.	.21	.20	**.57**	.03	.41
VE11: My colleagues help make challenging teaching problems seem more manageable.	.17	-.08	**.60**	.32	.40
VE12: I often try to visualize myself working through the most difficult teaching situations.	-.14	-.10	**.67**	-.18	.50
VE14: I often think or talk through difficult teaching problems I might encounter.	.08	-.18	**.85**	.03	.69
Social Persuasions α = .72					
SP6: I have been recognized for excellence in teaching.	-.07	**.49**	.23	.22	.49
SP7: Most of my students' parents believe I'm a good teacher.	-.03	**.67**	-.13	.09	.48
SP9: My students have told me that I have taught them a great deal.	-.01	**.77**	-.10	-.08	.54
SP12: My administrators and colleagues have told me that I am a good teacher.	.08	**.81**	-.03	.09	.67
Physiological and Affective States α = .82					
PA2: I feel relaxed when I am teaching.*	**.44**	-.08	.13	-.34	.44
PA4: Teaching is stimulating for me.*	**.49**	-.25	-.38	.10	.58
PA7: Working with difficult students puts me in a bad mood.	**.53**	-.16	.11	.13	.32
PA8: I tend to get depressed when I think about going to school.	**.75**	.06	.03	-.01	.54
PA10: Teaching puts me in a good mood.*	**.63**	-.30	-.15	.04	.65
PA11: Just entering the school building makes me feel stressful and nervous.	**.66**	.13	.06	-.35	.61
PA14: Teaching makes me exhausted.	**.64**	.21	.25	-.13	.47
PA15: I look forward to going to work each day.*	**.79**	.02	-.09	.07	.62

Note. Factor loadings greater than |.40| are in bold. Com = Communality Estimate
* This item was reverse scored.

Table 10

Inter-Factor Correlation for Final Sources of Teaching Self-Efficacy Scale

	Factor 1 Physiological and Affective States	**Factor 2** Social Persuasions	**Factor 3** Vicarious Experiences
Factor 2 Social Persuasions	-.30		
Factor 3 Vicarious Experiences	-.11	.23	
Factor 4 Mastery Experiences	-.24	.31	-.07

Table 11

Intercorrelations Among Items on Final Sources of Teaching Self-Efficacy Scale

Item	*M*	*SD*	ME2	ME5	ME8	ME12	VE7	VE11	VE12	VE14	SP6	SP7	SP9	SP12	PA2	PA4	PA7	PA8	PA10	PA11	PA14	PA15
ME2	6.9	1.8	**.38**																			
ME5	7.8	1.7	.27*	**.46**																		
ME8	7.0	2.3	.36**	.38**	**.52**																	
ME12	8.3	1.2	.21*	.36**	.37**	**.42**																
VE7	8.2	1.2	.08	.03	-.04	.05	**.38**															
VE11	7.1	1.7	.21*	-.01	.05	.13	.23*	**.29**														
VE12	5.3	2.4	.00	-.07	-.03	-.13	.25*	.14	**.41**													
VE14	6.5	2.3	.12	-.07	.05	-.09	.36**	.32**	.51**	**.57**												
SP6	6.5	2.3	.27*	.23*	.28**	.28**	.10	.25*	.15	.14	**.50**											
SP7	7.8	1.7	.25*	.22*	.31**	.33**	.13	.00	-.05	-.02	.33**	**.44**										
SP9	7.5	1.1	.24*	.10	.28**	.26*	.04	.00	.10	-.01	.31**	.34**	**.49**									
SP12	7.9	1.3	.27*	.15	.29**	.36**	.23*	.14	.04	-.01	.51**	.37**	.49**	**.62**								
PA2	3.1	1.7	-.29*	-.27*	-.27*	-.37**	.05	.00	.04	.08	-.24*	-.13	-.21*	-.24*	**.49**							
PA4	2.2	1.4	-.26*	-.07	-.19*	-.10	-.21*	-.13	-.30**	-.31**	-.33**	-.17*	-.32**	-.21*	.29**	**.49**						
PA7	4.6	2.3	.17*	.03	-.19*	-.09	-.01	.05	-.04	-.08	-.14	-.26*	-.06	-.14	.29**	.18*	**.37**					
PA8	2.7	2.0	-.11	-.03	-.29**	-.15	.05	-.02	-.03	.02	-.16	-.17*	-.09	-.09	.27**	.35**	.21*	**.59**				
PA10	3.0	1.5	-.28	-.13	-.25*	-.21*	-.10	-.10	-.14	-.20	-.35**	-.20*	-.29**	-.32**	.39**	.65**	.34**	.34**	**.68**			
PA11	2.3	1.7	-.16	-.25*	-.39**	-.21*	.08	-.04	.05	.06	-.25*	-.16	-.17*	-.19*	.38**	.28**	.20*	.57**	.44**	**.61**		
PA14	5.4	2.6	-.08	-.05	-.24*	-.12	.21*	.07	-.03	.15	-.09	-.01	-.09	.00	.37**	.14	.26**	.31**	.28**	.40**	**.42**	
PA15	3.3	2.0	-.15	-.07	-.21*	-.06	.02	-.04	-.09	-.10	-.25*	-.11	-.10	-.16	.32**	.43**	.30**	.58**	.57**	.55**	.29**	**.66**

*$p < .05$, **$p < .001$.

Note. Item to subscale total correlations are in bold font.

Table 12

*Means, Standard Deviations, and Zero-Order Correlations for Variables in the Study (*N = *144)*

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Self-Efficacy	7.6	0.8	-----															
2. Self-Efficacy for Instructional Strategies	7.9	0.8	.77**	------														
3. Self-Efficacy for Classroom Management	7.7	1.0	.78**	.42**	------													
4. Self-Efficacy for Student Engagement	7.1	1.1	.84**	.50**	.45**	-----												
5. Mastery Experiences	7.5	1.2	.34**	.36**	.20*	.27*	-----											
6. Vicarious Experiences	6.7	1.4	.24*	.20*	.21*	.18	.02	-----										
7. Social Persuasions	7.5	1.2	.42**	.41**	.21*	.39**	.50**	.16	-----									
8. Physiological and Affective States	3.3	1.2	-.34**	-.28**	-.17*	-.35**	-.40**	-.05	-.35**	-----								

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
9. Collective Efficacy	7.7	0.7	.61**	.50**	.40**	.56**	.21*	.21*	.26*	-.22*	-----							
10. Collective Efficacy for Instructional Strategies	7.7	0.8	.56**	.49**	.26*	.58**	.22*	.18*	.29**	-.19*	.87**	-----						
11. Collective Efficacy for Student Discipline	7.6	0.8	.51**	.39**	.43**	.40**	.16	.20*	.18*	-.19*	.89**	.54**	-----					
12. Satisfaction	7.3	1.3	.36**	.29**	.21*	.36**	.21*	.16	.21*	-.56**	.40**	.33**	.37**	-----				
13. Stress	6.3	2.3	-.13	-.11	-.03	-.18*	-.23	.12	-.14	.43**	-.08	-.12	-.03	-.14	-----			
14. Authenticity	7.2	1.5	.25*	.31**	.19*	.14	.56**	.02	.43**	-.29**	.13	.17*	.07	.08	-.24*	-----		
15. Optimism	7.1	1.0	.26*	.25*	.16	.21*	.35**	.09	.22*	-.43**	.15	.21*	.06	.13	-.28**	.37**	-----	
16. Inviting Self	6.9	1.3	.14	.19*	.01	.15	.38**	.03	.40**	-.35**	.11	.13	.06	.25*	-.25*	.43**	.24*	----
17. Inviting Others	7.7	0.8	.27*	.29**	.12	.23*	.18*	.18*	.23*	-.35**	.19*	.15	.19*	.37**	-.05	.25*	.15	.42**

*$p < .05$, **$p < .001$ *Note.*

Table 13

Standardized Regression Results for the Prediction of Teaching Self-Efficacy.

	Teaching Self Efficacy			
	Instructional Strategies	Classroom Management	Student Engagement	Total Scale
Mastery Experiences (β)	**.122**	**.054**	**.019**	**.067**
SE	.062	.078	.081	.055
Structure Coefficient	.768	.625	.554	.648
Uniqueness Index	.024	.004	.000	.008
Vicarious Experiences (β)	**.054**	**.117**	**.080**	**.084**
SE	.049	.061	.064	.044
Structure Coefficient	.426	.656	.370	.457
Uniqueness Index	.008	.026	.018	.021
Social Persuasions (β)	**.203***	**.115**	**.281***	**.202****
SE	.066	.083	.086	.059
Structure Coefficient	.896	.656	.801	.800
Uniqueness Index	.057	.014	.064	.067
Physiological/ Affective States (β)	**-.054**	**-.091**	**-.217***	**-.117***
SE	.058	.073	.078	.052
Structure Coefficient	-.597	-.531	-.719	-.648
Uniqueness Index	.005	.011	.049	.029
Model R^2	.22**	.10*	.24**	.28**

*$p < .05$, **$p < .001$.

Table 14

Means, Standard Deviations, and One-Way Analysis of Variance (ANOVA) of the Hypothesized Sources by Education and Teaching Experience

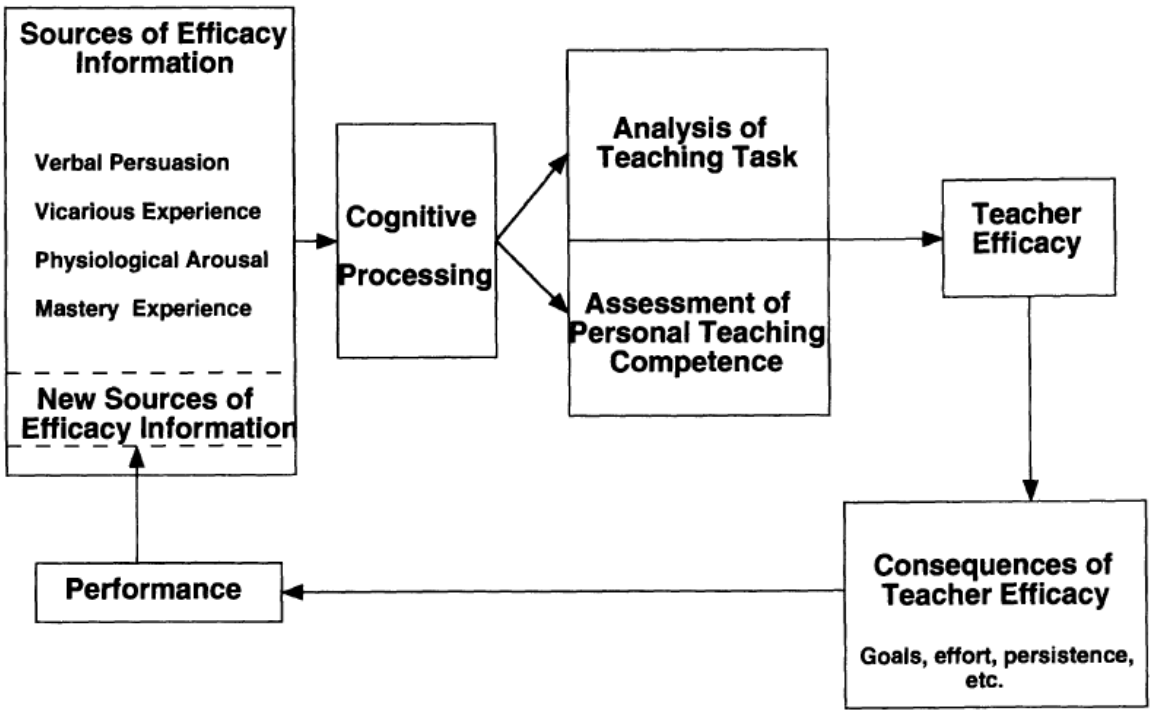
	Level of Education			Teaching Experience		
	Bachelor's	Master's		Novice (≤ 5 years)	Career (> 5 years)	
	M (*SD*)	*M* (*SD*)	*F*	*M* (*SD*)	*M* (*SD*)	*F*
Mastery Experiences	7.67 (1.06)	7.24 (1.40)	3.68	6.98 (1.28)	7.67 (1.18)	9.09**
Vicarious Experiences	6.90 (1.22)	6.60 (1.35)	1.87	6.68 (1.47)	6.78 (1.30)	0.16
Social Persuasions	7.49 (1.10)	7.39 (1.26)	0.23	6.78 (1.28)	7.76 (1.00)	23.66**
Physiological/ Affective States	3.28 (1.33)	3.42 (1.19)	0.43	3.35 (1.27)	3.31 (1.25)	0.04

*$p < .05$, **$p < .001$

Figures

Figure 1.

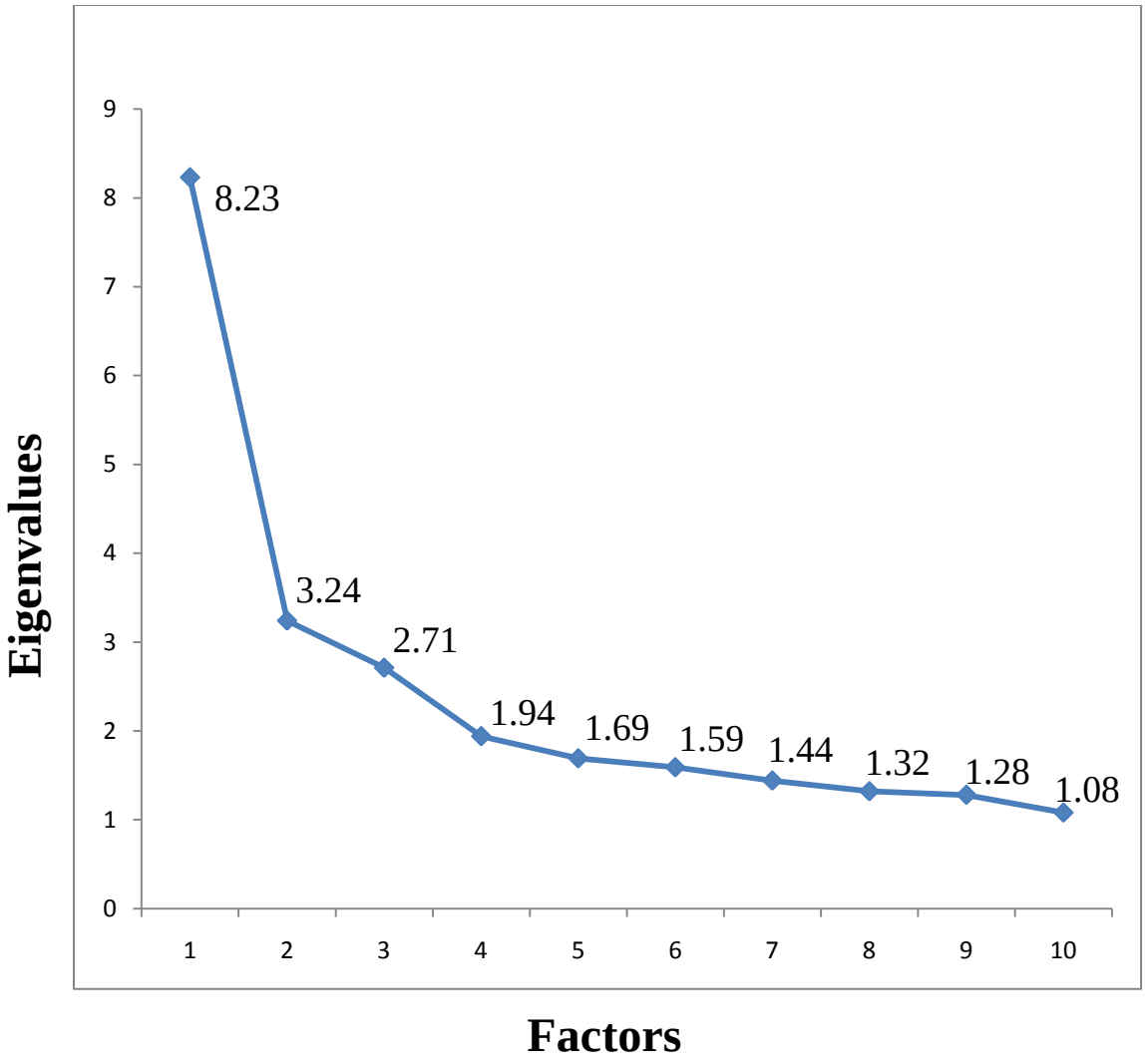
The cyclical nature of teaching self-efficacy outcomes.



From "Teacher Efficacy: Its Meaning and Measure" by M. Tschannen-Moran, A. Woolfolk-Hoy, & W. K. Hoy, *Review of Educational Research, 68*, p. 228. Copyright 1998 by American Educational Research Association.

Figure 2.

Scree Plot of Eigenvalues From Initial Exploratory Factor Analysis



Appendix A

Survey Used in the Study

Teacher Survey

This questionnaire is designed to improve understanding about some of the things that influence teachers in their school activities. Your answers to this survey are confidential. Thank you so much for your time!

1. What **grade**(s) do you teach? (for current school year)	
What **subject**(s) do you teach? _____	
2. Please circle the socioeconomic status of the majority of your students. (family income level compared to most people in your city and/or state)	1 2 3 4 5 Low……..Average……..High
3. Number of years teaching?	
4. Years at current school?	
5. Age?	
6. Gender? (circle one)	Female Male
7. Country of birth?	
8. Ethnic/cultural heritage? (e.g., White, African American/Black, Hispanic)	
9. Highest degree earned?	
10. How long do you plan to remain in teaching?	

Section A

Please circle the number that best answers the question for you.

	How much can you do?	1 Nothing	2	3 Very little	4	5 Some	6	7 Quite a bit	8	9 A great deal
1	How much can you do to control disruptive behavior in the classroom?	1	2	3	4	5	6	7	8	9
2	How much can you do to motivate students who show low interest in school work?	1	2	3	4	5	6	7	8	9
3	How much can you do to get students to believe they can do well in school work?	1	2	3	4	5	6	7	8	9
4	How much can you do to help students value learning?	1	2	3	4	5	6	7	8	9
5	How much can you do to craft good questions for students?	1	2	3	4	5	6	7	8	9
6	How much can you do to get children to follow classroom rules?	1	2	3	4	5	6	7	8	9
7	How much can you do to calm a student who is disruptive or noisy?	1	2	3	4	5	6	7	8	9
8	How much can you do to establish a classroom management system with each group of students?	1	2	3	4	5	6	7	8	9
9	How much can you do to implement a variety of assessment strategies?	1	2	3	4	5	6	7	8	9
10	How much can you do to provide an alternative explanation when students are confused?	1	2	3	4	5	6	7	8	9
11	How much can you do to assist families in helping their children do well in school?	1	2	3	4	5	6	7	8	9
12	How much can you do to implement alternative strategies in your classroom?	1	2	3	4	5	6	7	8	9

Section B Please circle the number that best answers the question for you.	1 Disagree strongly	2	3 Disagree	4	5 Neutral	6	7 Agree	8	9 Agree strongly
I am satisfied with my job.	1	2	3	4	5	6	7	8	9
I am happy with the way my colleagues and supervisors treat me.	1	2	3	4	5	6	7	8	9
I am satisfied with what I achieve at work.	1	2	3	4	5	6	7	8	9
I feel good at work.	1	2	3	4	5	6	7	8	9
I am satisfied with teaching in my current location.	1	2	3	4	5	6	7	8	9
I find teaching to be very stressful.	1	2	3	4	5	6	7	8	9

Section C ***As a teacher, how great a source of stress are these factors to you?***	1 No stress	2	3 Mild stress	4	5 Moderate stress	6	7 Much stress	8	9 Extreme stress
Difficult class	1	2	3	4	5	6	7	8	9
Responsibility for students (e.g., exam success)	1	2	3	4	5	6	7	8	9
Noisy students	1	2	3	4	5	6	7	8	9
Too much work to do (e.g., preparing lessons/marking)	1	2	3	4	5	6	7	8	9
Maintaining class discipline	1	2	3	4	5	6	7	8	9
Students' impolite behavior or rudeness	1	2	3	4	5	6	7	8	9
Having extra duties/responsibilities because of absent teachers	1	2	3	4	5	6	7	8	9
Large class size	1	2	3	4	5	6	7	8	9

Section D ***In your opinion, how important is it that you and your family…***	1 Not important	2	3	4 A little important	5	6	7 Important	8	9 Very important
Let relatives stay with you for a short time when they need some help	1	2	3	4	5	6	7	8	9
Turn to each other in times of trouble	1	2	3	4	5	6	7	8	9
Raise each other's children whenever there is a need	1	2	3	4	5	6	7	8	9
Do everything you can to help each other move ahead in life	1	2	3	4	5	6	7	8	9
Take responsibility for caring for older family members	1	2	3	4	5	6	7	8	9
Call, write, or see each other often	1	2	3	4	5	6	7	8	9

Section E

Please respond to each of the questions by considering the *current* ability, resources, and opportunity of teaching staff in your school to do each of the following.

		1	2	3	4	5	6	7	8	9
	How much can your school do?	**Nothing**		**Very little**		**Some**		**Quite a bit**		**A great deal**
1	How much can teachers in your school do to produce meaningful student learning?	1	2	3	4	5	6	7	8	9
2	How much can your school do to get students to believe they can do well in schoolwork?	1	2	3	4	5	6	7	8	9
3	To what extent can teachers in your school make expectations clear about appropriate student behavior?	1	2	3	4	5	6	7	8	9
4	To what extent can school personnel in your school establish rules and procedures that facilitate learning?	1	2	3	4	5	6	7	8	9
5	How much can teachers in your school do to help students master complex content?	1	2	3	4	5	6	7	8	9
6	How much can teachers in your school do to promote deep understanding of academic concepts?	1	2	3	4	5	6	7	8	9
7	How well can teachers in your school respond to defiant students?	1	2	3	4	5	6	7	8	9
8	How much can school personnel in your school do to control disruptive behavior?	1	2	3	4	5	6	7	8	9
9	How much can teachers in your school do to help students think critically?	1	2	3	4	5	6	7	8	9
10	How well can adults in your school get students to follow school rules?	1	2	3	4	5	6	7	8	9
11	How much can your school do to foster student creativity?	1	2	3	4	5	6	7	8	9
12	How much can your school do to help students feel safe while they are at school?	1	2	3	4	5	6	7	8	9

Section F

	How often do these statements apply to you?	**Never**								**Always**
	I like to include others in the activities in my classroom.	1	2	3	4	5	6	7	8	9
	I try not to be critical of the people with whom I work.	1	2	3	4	5	6	7	8	9
	I congratulate my colleagues on their successes.	1	2	3	4	5	6	7	8	9
	I forgive my colleagues for their mistakes.	1	2	3	4	5	6	7	8	9
	I am quick to recognize my own value as a teacher.	1	2	3	4	5	6	7	8	9
	I am impressed with the abilities of others with whom I work.	1	2	3	4	5	6	7	8	9
	I plan time for enjoyable activities that I can do on my own.	1	2	3	4	5	6	7	8	9
	I congratulate myself on my teaching successes.	1	2	3	4	5	6	7	8	9
	I pay attention to my own needs.	1	2	3	4	5	6	7	8	9
	I am quick to recognize the value of others with whom I work.	1	2	3	4	5	6	7	8	9
	I forgive myself for my mistakes in teaching.	1	2	3	4	5	6	7	8	9
	I am impressed with my own teaching abilities.	1	2	3	4	5	6	7	8	9

3

Section G

Below you will find a number of statements. *Please indicate* ***how true or false each statement is for you.***

How true or false is each statement for you?	Definitely False								Definitely True
When I'm not sure what is going to happen, I usually expect that the best possible thing will happen.	1	2	3	4	5	6	7	8	9
If something can go wrong for me, it will.	1	2	3	4	5	6	7	8	9
I always look on the bright side of things.	1	2	3	4	5	6	7	8	9
I hardly ever expect things to go my way.	1	2	3	4	5	6	7	8	9
I'm always optimistic about my future.	1	2	3	4	5	6	7	8	9
Things never work out the way I want them to.	1	2	3	4	5	6	7	8	9
I feel confident that I will succeed in the future.	1	2	3	4	5	6	7	8	9
Good things never happen to me.	1	2	3	4	5	6	7	8	9
Most things in life have a happy ending.	1	2	3	4	5	6	7	8	9
When I'm not sure what is going to happen, I usually expect that the worst possible thing will happen.	1	2	3	4	5	6	7	8	9
Things usually work out the way I want them to.	1	2	3	4	5	6	7	8	9
If something *can* go wrong for me, it *will* go wrong.	1	2	3	4	5	6	7	8	9
Sometimes I'm afraid other people will discover that I'm not a very good teacher.	1	2	3	4	5	6	7	8	9
I believe that I deserve whatever praise and recognition I receive for my teaching.	1	2	3	4	5	6	7	8	9
Sometimes I'm afraid that other people think I'm a better teacher than I really am.	1	2	3	4	5	6	7	8	9
When someone compliments me for my teaching, I usually feel I don't deserve the compliment.	1	2	3	4	5	6	7	8	9
I'm afraid that other people important to me may find out I'm not as competent a teacher as they think I am.	1	2	3	4	5	6	7	8	9
When I teach well, it's usually out of luck.	1	2	3	4	5	6	7	8	9
I am good at teaching.	1	2	3	4	5	6	7	8	9
I'll never teach as well as the best teachers in my school.	1	2	3	4	5	6	7	8	9
I start to feel stressed whenever I think about teaching.	1	2	3	4	5	6	7	8	9
People I respect believe that I can succeed as a teacher.	1	2	3	4	5	6	7	8	9
I have always been good at teaching.	1	2	3	4	5	6	7	8	9
I had an excellent teaching model when I began teaching.	1	2	3	4	5	6	7	8	9

Section H ***How true or false is each statement for you?***	Definitely False								Definitely True
I feel relaxed when I am teaching.	1	2	3	4	5	6	7	8	9
When I'm having trouble at school, people I care about tell me they believe I can handle it.	1	2	3	4	5	6	7	8	9
My students usually do better than other teachers' students.	1	2	3	4	5	6	7	8	9
I teach very well.	1	2	3	4	5	6	7	8	9
When I prepare to teach a tough lesson, I often remind myself that I have done well teaching tough lessons before.	1	2	3	4	5	6	7	8	9
People have told me that I may not have what it takes to be a good teacher.	1	2	3	4	5	6	7	8	9
I have close family members who were/are educators.	1	2	3	4	5	6	7	8	9
My last teaching evaluation was excellent.	1	2	3	4	5	6	7	8	9
I have role models who are teachers.	1	2	3	4	5	6	7	8	9
I usually do a poor job covering new material with students.	1	2	3	4	5	6	7	8	9
I am one of the most competent teachers at my school.	1	2	3	4	5	6	7	8	9
My family members have often told me that I am a good teacher.	1	2	3	4	5	6	7	8	9
When a particular lesson is difficult for me to teach, I just put more effort into it.	1	2	3	4	5	6	7	8	9
By watching excellent teachers around me, I often learn better ways to approach my own teaching.	1	2	3	4	5	6	7	8	9
Teaching is stimulating for me.	1	2	3	4	5	6	7	8	9
People criticize my teaching.	1	2	3	4	5	6	7	8	9
When I do poorly teaching a particular concept, I just try harder next time.	1	2	3	4	5	6	7	8	9
Most of the teachers with whom I work closely are confident in their teaching abilities.	1	2	3	4	5	6	7	8	9
I have been recognized for excellence in teaching.	1	2	3	4	5	6	7	8	9
I do not feel as though I have developed enough strategies to perform my job well.	1	2	3	4	5	6	7	8	9
Before I am observed, I can feel my heart pounding or I get a stomach ache.	1	2	3	4	5	6	7	8	9
Most of my students' parents believe I'm a good teacher.	1	2	3	4	5	6	7	8	9
Compared to other elementary school teachers, I am quite good at teaching.	1	2	3	4	5	6	7	8	9
I have succeeded at getting through to even the most difficult students.	1	2	3	4	5	6	7	8	9
I often think about what an ineffective teacher I am.	1	2	3	4	5	6	7	8	9
The administrators at my school compare me to other teachers.	1	2	3	4	5	6	7	8	9
Most of the teachers I work with are better than me.	1	2	3	4	5	6	7	8	9
Working with difficult students puts me in a bad mood.	1	2	3	4	5	6	7	8	9
My students have told me that I have taught them a great deal.	1	2	3	4	5	6	7	8	9
I need a good deal of help to succeed as a teacher.	1	2	3	4	5	6	7	8	9

Section I ***How true or false is each statement for you?***	Definitely False								Definitely True
My colleagues help make challenging teaching problems seem more manageable.	1	2	3	4	5	6	7	8	9
I don't have to put forth a lot of effort to teach well.	1	2	3	4	5	6	7	8	9
I tend to get depressed when I think about going to school.	1	2	3	4	5	6	7	8	9
I often try to visualize myself working through the most difficult teaching situations.	1	2	3	4	5	6	7	8	9
When I have to teach new concepts, I feel nervous.	1	2	3	4	5	6	7	8	9
People have told me that I'm successful in the classroom because I work hard.	1	2	3	4	5	6	7	8	9
Even when I plan for hours, I don't teach very effectively.	1	2	3	4	5	6	7	8	9
Teaching puts me in a good mood.	1	2	3	4	5	6	7	8	9
People often point out how much progress I've made as a teacher.	1	2	3	4	5	6	7	8	9
Seeing others teach better than me pushes me to do better.	1	2	3	4	5	6	7	8	9
My administrators and colleagues have told me that I am a good teacher.	1	2	3	4	5	6	7	8	9
Just entering the school building makes me feel stressful and nervous.	1	2	3	4	5	6	7	8	9
Although I have sometimes had difficulty with teaching, in general I've been getting better at it.	1	2	3	4	5	6	7	8	9
I often think or talk through difficult teaching problems I might encounter.	1	2	3	4	5	6	7	8	9
I have been told that I should consider applying for National Board Certification.	1	2	3	4	5	6	7	8	9
I'm never going to get much better at teaching than I am right now.	1	2	3	4	5	6	7	8	9
My whole body becomes tense when I have to present difficult concepts to my students.	1	2	3	4	5	6	7	8	9
My colleagues provide me with constructive criticism that helps me improve my teaching.	1	2	3	4	5	6	7	8	9
Compared to most teachers, it takes me a lot longer to prepare lessons and handle my duties.	1	2	3	4	5	6	7	8	9
Just thinking about doing lesson plans makes me feel nervous.	1	2	3	4	5	6	7	8	9
I often think about my past lessons that have gone particularly well.	1	2	3	4	5	6	7	8	9
Teaching makes me exhausted.	1	2	3	4	5	6	7	8	9
Most people I respect in life are those who are good teachers.	1	2	3	4	5	6	7	8	9
The administrators at my school are happy with my teaching performance as long as I am making improvements.	1	2	3	4	5	6	7	8	9
I look forward to going to work each day.	1	2	3	4	5	6	7	8	9

Thank you again for taking the time to complete this survey. If you would like further information about this study or to request a copy of the final results, please contact Ellen Usher at ellen.usher@emory.edu.

Appendix B

Teacher Survey Items Analyzed in Previous Research

Teacher Self-Efficacy

Student Engagement

How much can you do to motivate students who show low interest in school work?
How much can you do to get students to believe they can do well in school work?
How much can you do to help students value learning?
How much can you do to assist families in helping their children do well in school?

Instructional Strategies

How much can you do to craft good questions for students?
How much can you do to implement a variety of assessment strategies?
How much can you do to provide an alternative explanation when students are confused?
How much can you do to implement alternative strategies in your classroom?

Classroom Management

How much can you do to control disruptive behavior in the classroom?
How much can you do to calm a student who is disruptive or noisy?
How much can you do to get children to follow classroom rules?
How much can you do to establish a classroom management system with each group of students?

Collective Teacher Efficacy

How much can teachers in your school do to produce meaningful student learning?
How much can your school do to get students to believe they can do well in schoolwork?
To what extent can teachers in your school make expectations clear about appropriate student behavior?
To what extent can school personnel in your school establish rules and procedures that facilitate learning?
How much can teachers in your school do to help students master complex content?
How much can teachers in your school do to promote deep understanding of academic concepts?
How well can teachers in your school respond to defiant students?
How much can school personnel in your school do to control disruptive behavior?
How much can teachers in your school do to help students think critically?
How well can adults in your school get students to follow school rules?
How much can your school do to foster student creativity?
How much can your school do to help students feel safe while they are at school?

Teacher Satisfaction (In addition to the item "I am satisfied with my job.")
I am happy with the way my colleagues and supervisors treat me.
I am satisfied with what I achieve at work.
I feel good at work.
I am satisfied with teaching in my current location.

Teacher Stress-Single Item
I find teaching to be very stressful.

Appendix C

Teacher Survey Items Not Yet Analyzed

Optimism

1. When I'm not sure what is going to happen, I usually expect that the best possible thing will happen.
2. If something can go wrong for me, it will.
3. I always look on the bright side of things.
4. I hardly ever expect things to go my way.
5. I'm always optimistic about my future.
6. Things never work out the way I want them to.
7. I feel confident that I will succeed in the future.
8. Good things never happen to me.
9. Most things in life have a happy ending.
10. When I'm not sure what is going to happen, I usually expect that the worst possible thing will happen.
11. Things usually work out the way I want them to.
12. If something can go wrong for me, it will go wrong.

Teacher Authenticity

1. Sometimes I'm afraid other people will discover that I'm not a very good teacher.
2. I believe that I deserve whatever praise and recognition I receive for my teaching.
3. Sometimes I'm afraid that other people think I'm a better teacher than I really am.
4. When someone compliments me for my teaching, I usually feel I don't deserve the compliment.
5. I'm afraid that other people important to me may find out I'm not as competent as they think I am.
6. When I teach well, it's usually out of luck.

Invitations

Inviting Self

1. I plan time for enjoyable activities that I can do on my own.
2. I am quick to recognize my own value as a teacher.
3. I congratulate myself on my teaching successes.
4. I pay attention to my own needs.
5. I forgive myself for my mistakes in teaching.
6. I am impressed with my own teaching abilities.

Inviting Others

1. I like to include others in the activities in my classroom.
2. I try not to be critical of others with whom I work.
3. I congratulate my colleagues on their successes.
4. I forgive my colleagues for their mistakes.
5. I am impressed with the abilities of others with whom I work.
6. I am quick to recognize the value of others with whom I work.

Sources of Self-Efficacy

Mastery Experiences

1. I am good at teaching.
2. I have always been good at teaching.
3. I teach very well.
4. My last teaching evaluation was excellent.
5. I usually do poorly when I'm covering new material with students.
6. When a particular lesson is difficult for me to teach, I just put more effort into it.
7. When I do poorly teaching a particular concept, I just try harder next time.
8. I have developed a number of strategies to help me succeed at teaching.
9. I have succeeded at getting through to even the most difficult students.
10. I need a good deal of help to succeed as a teacher.
11. I don't have to put forth a lot of effort to teach well.
12. Even when I plan for hours, I don't teach very effectively.
13. Although I have sometimes had difficulty with teaching, in general I've been getting better at it.
14. I'm never going to get much better at teaching than I am right now.
15. I often focus on my past lessons that have gone particularly well.

Vicarious Experience

1. Compared to others elementary school teachers, I am a quite good at teaching.
2. My students usually do better than do other teachers' students.
3. I had an excellent teaching model when I began teaching.
4. I have close family members who were/are educators.
5. Seeing other teachers try to reach difficult students and fail usually convinces me that I too will fail when working with similar students.
6. By watching excellent teachers around me, I often learn better ways to approach my own teaching.
7. Most of the teachers I work with are confident in their teaching abilities.
8. My colleagues help make challenging teaching problems seem more manageable.
9. There are a number of excellent teachers at my school.
10. I'll never teach as well as the top teachers in my school.
11. Seeing others teach better than me pushes me to do better.
12. I often try to visualize myself working through the most difficult teaching situations.
13. I often think or talk through difficult teaching problems I might encounter.
14. Compared to other teachers, it takes me a lot longer to prepare lessons and handle my duties.
15. Most people I respect in life are those who are good teachers.

Social Persuasions

1. People I respect believe that I can succeed as a teacher.
2. When I'm having trouble at school, people I care about tell me they believe I can handle it.
3. People have told me that I may not have what it takes to be a good teacher.
4. My family members have often told me that I am a good teacher.
5. My administrators and colleagues have told me that I am a good teacher.
6. I have been recognized for excellence in teaching.
7. My students' parents have told me I'm a good teacher.
8. My students have told me that I have taught them a great deal.
9. People have told me that I'm successful in the classroom because I work hard.
10. People often point out how much progress I've made as a teacher.
11. I have often been told that I should consider applying for National Board Certification.
12. My colleagues provide me with constructive criticism that helps me improve my teaching.
13. People criticize my teaching.
14. The administrators at my school compare me to other teachers.
15. The administrators at my school are happy with my teaching performance as long as I am making improvements.

Physiological and Affective States

1. I start to feel stressed whenever I think about teaching.
2. Just entering the school building makes me feel stressful and nervous.
3. Just thinking about doing lesson plans makes me feel nervous.
4. When I have to teach new concepts, I feel nervous.
5. Teaching makes me feel exhausted.
6. Before I am observed, I can feel my heart pounding or I get a stomach ache.
7. My whole body becomes tense when I have to teach difficult concepts.
8. I feel relaxed when I am teaching.
9. I often think about what an ineffective teacher I am.
10. I look forward to going to work each day.
11. Teaching puts me in a good mood.
12. Working with difficult students puts me in a bad mood.
13. When I prepare to teach a tough lesson, I often remind myself that I have done well teaching tough concepts before.
14. I tend to get depressed when I think about going to school.
15. Teaching is stimulating for me.
