

EXAMINING THE SOURCES OF TEACHER EFFICACY
AND HOW THE CONTEXT OF TEACHING CONTRIBUTES TO
TEACHER EFFICACY

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A Dissertation
Submitted in Partial Fulfillment
of the Requirements for
the Degree of Doctor of Education
in Curriculum and Leadership

Columbus State University
Columbus, GA

November 2015

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CHAPTER I

INTRODUCTION

Early education researchers posited that a student's background was the primary factor in academic achievement and there was little that teachers could do to overcome this source (Coleman, Campbell, Hobson, McPartland, Mood, Winefield & York, 1966). In response to this bleak outlook in education, researchers have searched for factors that can make a difference in student achievement, regardless of home environment. Self-efficacy, which "refers to beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments," (Bandura, 1997, p. 3), has been an important concept in educational research for teachers (Pajares, 1992). Schacter and Thum (2005) indicated an effective teacher as the most important educational variable related to student achievement and Woolfolk and Hoy (1990) stated effectiveness is related to a teacher's self-efficacy. Teacher efficacy is the belief a teacher holds about their individual ability to affect student performance (Klassen, Tze, Betts & Gordon, 2011; Tschannen-Moran, Woolfolk Hoy & Hoy, 1998).

Teacher efficacy has been tied to educational outcomes (Andreou & Rapti, 2010) such as student achievement, student motivation (Klassen et al., 2011), innovation in the classroom (Woolfolk & Hoy, 1990), and building student self-efficacy (Cooper-Twamley, 2009). Teacher efficacy has also been correlated with teacher behavior in their own classroom and how they manage their classroom (Dibapile, 2012; Klassen et al., 2011; Woolfolk, Rosoff & Hoy, 1990) instructional strategies, how teachers persist in the field (Andreou & Rapti, 2010), job stress, burnout, job satisfaction (Vesely, Saklofske, &

Leschied, 2013), teacher retention (Cooper-Twamley, 2009), and even competency evaluations (Woolfolk & Hoy, 1990). Teachers with a low sense of teacher efficacy are subject to negative influences such as increased job stress, low job satisfaction and difficulty in the classroom (Klassen et al., 2011). Teacher efficacy is one of the few variables that consistently relates to positive educational outcomes (Woolfolk & Hoy, 1990), therefore, more attention should be paid to the origins of teacher efficacy as well as other factors that can shape a teacher's efficacy beliefs.

Statement of the Problem

Throughout the years, the concept of teacher efficacy has been heavily researched (Adams & Forsyth, 2006; Klassen et al., 2011; Tschannen-Moran & Woolfolk Hoy, 2001a). Bandura (1977) stated that self-efficacy is formed through a person's mastery experiences, vicarious experiences, verbal persuasions and their physiological and affective states, with mastery experiences being the most influential of the four sources of efficacy. Many measures of teacher efficacy rooted in Bandura's four sources of efficacy have been used to clearly determine a teacher's sense of efficacy, while many studies have not used a measurement rooted in Bandura's theory (Henson, 2002). The validity and reliability of those measures have been questioned and therefore researchers are unsure if teacher efficacy has been adequately measured (Tschannen-Moran et al., 1998).

Researchers have tested the effects of teacher efficacy and variables connected to teachers' self-efficacy (Tschannen-Moran & Woolfolk Hoy, 2007). However, limited research has been completed on how teachers form their efficacy beliefs (Henson, 2002; Klassen, et al., 2011; Oh, 2011; Morris, 2010; Tschannen-Moran & Woolfolk Hoy, 2001a). In their analysis of 218 studies based on teacher efficacy, Klassen, Tze, Betts

and Gordon (2011) found only seven studies between 1998 and 2009 that explored the sources of teacher efficacy. The practical implications such as sources of efficacy beliefs and how they are formed by teachers (Henson, 2002; Klassen et al., 2011; Oh, 2011), how to change teachers' self-efficacy to benefit students (Pajares, 1996; Tschannen-Moran & Woolfolk Hoy, 2001a), how to increase a teacher's sense of efficacy (Klassen et al., 2011) and what is needed to build high teacher efficacy (Tschannen-Moran & Woolfolk Hoy, 2001a) are lacking. Researchers of teacher efficacy need to move away from the direction of theory and into practical research that teachers can use everyday in the classroom (Henson, 2002; Klassen et al., 2011; Pajares, 1996). There is a need to better understand the formation of teacher's efficacy beliefs. Therefore, the researcher proposes to examine how the practice of teaching is influenced by the sources of teacher efficacy to shape their beliefs.

Research Questions

Five questions will guide the research study:

1. What is the teacher efficacy reported by the participants in the study as measured by the Teachers' Sense of Efficacy Scale?
2. What is the difference, if any, in teacher efficacy among demographic and contextual factors reported by the participants in the study?
3. To what extent is teacher efficacy derived from the four sources of teacher efficacy (1) mastery experiences, (2) verbal persuasions, (3) vicarious experiences, and (4) physiological and affective states as measured by the Teacher Ratings Questionnaire?
4. What is the difference, if any, in the sources of teacher efficacy among demographic and contextual factors reported by the participants in the study?

5. What are the relationships between teacher efficacy, mastery experiences, verbal persuasions, vicarious experiences, physiological and affective states, demographic and contextual factors?

Definitions

The following terms are used throughout the study and definitions are provided to ensure understanding of these terms.

Mastery Experiences – An individual’s personal experiences where successful experiences build efficacy beliefs and failed experiences undermine efficacy beliefs and according to Bandura (1994), the most influential source of efficacy.

Physiological and Affective States – A source of self-efficacy based on an individual’s psychological and physical reaction to experiences, such as stress, tension, fatigue and mood (Bandura, 1994).

Self-Efficacy – “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments,” (Bandura, 1997, p. 3),

Sources of Self-Efficacy – Four principles from which people build their self-efficacy beliefs, which are (1) mastery experiences, (2) vicarious experiences, (3) verbal persuasion, and (4) physiological and affective states (Bandura, 1997).

Teacher Efficacy – Tschannen-Moran & Woolfolk Hoy (2001a) defined teacher efficacy as, “ a judgment of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult of unmotivated” (p. 783).

Triadic Reciprocal Causation – The “transactional view of self and society, internal personal factors in the form of cognitive, affective, and biological events; behavior; and

environmental events all operate as acting determinants that influence one another bidirectionally” (Bandura, 1997, p.6).

Verbal Persuasion – Bandura (1994) stated that social persuasion, or the persuasion from others that individuals are capable of mastery performance, is the third most effective way to build efficacy beliefs.

Vicarious Experiences – Experiences of other people’s successes or failures that individuals perceive to be similar to themselves and according to Bandura (1994), the second most effective way to shape efficacy beliefs.

Significance of the Problem

A person’s self-efficacy beliefs control their thoughts and actions (Bandura, 1997). A teacher’s efficacy beliefs impact their thoughts and behavior and also have an impact on their students (Tshcannen-Moran & Woolfolk Hoy, 2001a). Learning about the formation of teacher’s beliefs is needed to improve classroom practices (Pajares, 1992). A teacher’s efficacy beliefs affect their classroom behavior, how they prepare, whether they are innovative in the classroom (Tshcannen-Moran & Woolfolk Hoy, 2001a), their annual evaluations, and their classroom management (Woolfolk & Hoy, 1990). Student achievement and motivation can also be affected by a teacher’s sense of efficacy (Woolfolk & Hoy, 1990) as well as a student’s personal sense of self-efficacy (Tshcannen-Moran & Woolfolk Hoy, 2001a). Therefore, it is valuable to understand more about the sources of teacher efficacy, or more specifically, how teachers form their efficacy beliefs and other factors that may impact a teacher’ efficacy beliefs.

Learning more about the sources of a teacher’s efficacy beliefs can help teacher educators prepare teachers and build the efficacy beliefs of pre-service teachers in a

practical way, but to do this, they must have a without a better understanding of those beliefs (Pajares, 1992). Beliefs that are formed early are difficult to change and have strong influences on new information (Pajares, 1992). In a 1998 study, Tschannen-Moran, Woolfolk Hoy and Hoy (1998) reported that teacher efficacy could change for new teachers. Swan, Wolf and Cano (2011) reported that efficacy decreases with first year teachers, causing many to leave the field of education, but efficacy beliefs increased in the second year of teaching for those who remained in the field. However, Swan et al. (2011) did not report the cause of the decrease in efficacy of first year teachers or the cause of the increase in efficacy for second year teachers. Learning more about the source of teacher efficacy in first and second year teachers is important because that knowledge may be useful in teacher retention and teacher satisfaction.

Gaining a better understanding of the sources of teacher efficacy is also important to help experienced teachers, which can be done through professional development throughout a teacher's career. Tschannen-Moran et al. (1998) reported that teachers' efficacy beliefs develop differently based on the stage of their career, while Henson (2002) reported that teacher efficacy is a stable construct for experienced teachers. It is important to know at what point the concept of teacher efficacy becomes a stable construct, if at all. Tschannen-Moran & Woolfolk Hoy (2001a) stated the need for further research regarding how leadership may impact teacher efficacy, especially for experienced teachers, to determine whether certain leadership characteristics could have the potential to change a teacher's established sense of efficacy. There is a need to learn more about how professional development impacts teacher efficacy (Ross & Bruce, 2007). For professional development to be the most effective, it is important to know

how a teacher's experience or education level impacts their efficacy beliefs. The sources of teacher efficacy are predictors for a teacher's efficacy, once they have classroom experience (Oh, 2011). Tschannen-Moran and Woolfolk Hoy (2007) reported that mastery experiences were the most influential sources of efficacy beliefs for experienced teachers, but that additional research could yield more information about those mastery experiences.

Limitations

Several limitations exist for the current study. First, teachers will be self-reporting on the survey instrument. Their responses are based on their perceptions, which are subjective, not objective. Second, the study will focus on the relationships between teacher efficacy, sources of teacher efficacy, contextual factors and demographic variables related to teacher efficacy by using regression analysis. The correlation of variables does not imply causation. It is difficult to determine causation in the relationship between variables because actions are influenced by outcome beliefs (Pajares, 1996). For example, high teacher efficacy may result in increased student achievement, but the reverse may also be true. Increased student achievement may result in increased teacher efficacy. Additionally, little is known about additional factors that could shape teacher efficacy such as the school's culture, leadership, academics or discipline, which will not be included in this study.

Delimitations

The data for the study were collected through surveys and the surveys were distributed to participants in one district. That was the same district in which the primary

researcher was employed, which made the participants easily accessible. The variable may have impacted additional variables in the study.

Summary

Teacher efficacy is an important construct in education. Teacher efficacy has been linked to positive outcomes for students, such as motivation and achievement. It has also been linked to positive attributes for teachers, such as increased satisfaction, increased retention, more classroom innovation, and better teacher evaluations. However, little research has focused on the formation of those teacher efficacy beliefs. Self-efficacy is known to come from four sources (1) mastery experiences, (2) vicarious experiences, (3) verbal persuasion, and (4) physiological and affective states. It is necessary to further understand how the four sources of self-efficacy contribute to teacher efficacy. It is also necessary to determine whether other factors contribute to a teachers' efficacy beliefs. Knowing more about how teachers form their efficacy beliefs is important because that knowledge could be used in teacher preparation programs and also through feedback and professional development programs during a teacher's career. If more was known about teacher efficacy and how it was formed, it is possible that the adverse effects of a teacher with low efficacy, such as decreased satisfaction or decreased student achievement may be avoided.

CHAPTER II

REVIEW OF LITERATURE

The concept of teacher efficacy emerged from the self-efficacy theory *locus of control* and further investigation of the concept has been based on Bandura's (1977) framework of self-efficacy and Bandura's (1986) *social cognitive framework* (Bandura, 1977; Rotter, 1966; Wolters & Daugherty, 2007). Research results regarding teacher efficacy have been based on measurements using a multitude of instruments, regardless of problems that have arisen with some of the instruments (Tschannen-Moran et al., 1998). Few studies have measured sources of teacher efficacy and research results have been inconsistent regarding variables that may impact teacher efficacy (Henson, 2002; Klassen et al., 2011; Oh, 2011; Morris, 2010; Tschannen-Moran & Woolfolk Hoy, 2001a). Understanding where teacher efficacy comes from and how it is formed in the educational setting is of great importance to educators.

Self-Efficacy

Two theories have been present in the literature regarding the sources of self-efficacy (Henson, 2002). First, the construct of self-efficacy was based on locus of control, which is the internal and external controls that determine the outcome of a situation and shape the behavior and expectancies of people in those situations (Rotter, 1966). Second, Bandura (1977) proposed that self-efficacy came from one of four sources (1) performance accomplishments, (2) vicarious experience, (3) verbal persuasions, (4) physiological states and those sources shaped a person's self-efficacy beliefs. These four factors that influence self-efficacy have been used as a framework for sources of self-efficacy for more than 30 years (Oh, 2011). Bandura stated:

Not only can perceived self-efficacy have directive influence on choice of activities and setting, but, through expectations of eventual success, it can affect coping efforts once they are initiated. Efficacy expectations determine how much effort people will expend and how long they will persist in the face of obstacles and aversive experiences (p. 194).

Those who have a stronger sense of perceived self-efficacy will be more persistent in coping with stressful situations than those who have a weaker sense of perceived self-efficacy. Individuals with strong perceived sense of self-efficacy may believe a situation will be difficult, engage themselves in the situation only to determine that it is less threatening than expected, will grow their coping skills and learn from the experience. On the contrary, those with a weak sense of perceived self-efficacy will shy away from difficult situations and maintain their apprehension on coping under seemingly stressful circumstances (Bandura, 1977).

Bandura (1997) stated that a person's self-efficacy comes from four sources (1) mastery experiences (2) vicarious experiences (3) verbal persuasion and (4) physiological and affective states.

Mastery Experiences

In his study of self-efficacy, Bandura (1997) stated that mastery experiences or performance accomplishments based on personal mastery strongly influences self-efficacy. When an individual is successful in a task, self-efficacy increases as well as their own expectations. The growth in self-efficacy can then help an individual better cope in similar situations (Bandura, 1977). Efficacy is not entirely dependent upon these mastery experiences, but relies on the reflection of all facets of the experience (Goddard, Hoy & Woolfolk Hoy, 2004).

Vicarious Experiences

Bandura (1997) also stated self-efficacy can increase through vicarious experiences, or watching others cope with situations that one may feel is threatening. In a stressful situation where an individual watches someone else succeed in coping, the individual begins comparing himself or herself to that person and begins to believe that if that person can do something, so can they.

Verbal Persuasion

Self-efficacy can also increase through verbal persuasion, or the suggestions from others that individuals are capable and can be successful in dealing with threatening situations. A person's self-efficacy is weakly influenced through vicarious experiences and verbal persuasion, because no personal experience is involved (Bandura, 1977).

Physiological and Affective States

This source of efficacy comes from a person's emotional arousal, which is how a person feels about threatening situations, especially through feelings of anxiety and vulnerability, can influence a person's perceived sense of self-efficacy as well. As emotional arousal increases, performance can be hindered and can change an individual's personal expectations of performance (Bandura, 1977).

An abundance of research has been completed on self-efficacy (Henson, 2002; Pajares, 1996). Students' self-efficacy correlates with academic achievement (Tella, Tella, & Adika, 2008; Zimmerman & Bandura, 1994) and elevated goal setting (Zimmerman & Bandura, 1994). Self-efficacy also relates to problem solving, motivation, self-regulation, anxiety, and self-concept as well as teaching and teacher

education (Pajares, 1996). The concept of self-efficacy was first rooted in Rotter's (1966) theory of locus of control.

Locus of Control

The focus of Rotter's (1966) research was on outcome expectancy based on the amount of control a person has on a situation. Internal control is when a person believes that his or her own behavior can impact the outcome of a situation. External control is when a person believes that outcomes are dependent on external factors other than their own behavior. External factors could be luck, chance, power of another factor in the situation, or unpredictability due to the situation's complexity. Based on his research, Rotter determined that people tend to raise their expectancy levels when they believe they have internal control over a situation. When people believe that a situation is under external control, they are less likely to raise their expectancy levels (Rotter, 1966).

Another conclusion Rotter (1966) made from his research focused on behavior differences. Those who believed their fate was in their own hands were more alert to environments that included something useful to their future successes. They also tried to improve their environments, placed great value on achievements, paid close attention to their skills and failures and resisted outside influences that may change their mindset (Rotter, 1966). Researchers Tella, Tella and Adika (2008) reported self-efficacy is correlated with locus of control. In addition to the theory of locus of control, Bandura (1986) introduced his social cognitive theory, which has become another major theoretical concept in self-efficacy.

Social Cognitive Theory

According to Bandura's (1986) social cognitive theory, self-reflection influences efficacy beliefs. Through reflection, people can evaluate and change their own self-efficacy from their individual reaction to an event. Their future choices and behavior are influenced by their self-efficacy beliefs. These beliefs sway people's tendency to choose situations where they are confident of their capabilities and successful outcomes.

Personal factors, behavior and environment are produced by the individual, but also shape an individual's event outcomes. The idea that these three factors work together to cause and create outcomes is called triadic reciprocal determinism (Bandura, 1986).

In his research of teachers' beliefs, Pajares (1992) stated that individuals selectively choose what to reflect upon, based on their current belief systems. An individual's beliefs affect the memories they recall and the lens through which they recall those memories in a way that justifies their beliefs, therefore sustaining their original set of beliefs. He referred to this as a self-fulfilling prophecy, where beliefs shape perceptions, which shape behaviors that match a person's existing set of beliefs (Pajares, 1992). A teacher's belief is the foundation of teacher efficacy.

Teacher Efficacy

The idea of teacher efficacy was derived from self-efficacy research (Tschannen-Moran et al., 1998). Teacher efficacy is the degree to which teachers believe they are able to influence student performance (Cheung, 2008). General teaching efficacy (GTE) is the extent to which teachers believe that they are able to overcome external factors, such as conflict, environment, home, culture and community that impact student achievement (Swars, 2005; Tschannen-Moran et al., 1998). Personal teaching efficacy (PTE) is the

extent to which teachers believe that they have the ability and capacity to be effective in the classroom and help students learn from their teaching (Swars, 2005; Tschannen-Moran et al., 1998).

Pajares (1992) stated that teacher's beliefs influence their attitudes, judgments and actions. Teachers with a high sense of efficacy for instruction believe they are able to reach students, no matter what adverse circumstances may exist, such as lack of family support or troublesome students. Teachers with a low sense of efficacy are more apt to believe there is little that a teacher can do to overcome adversity inside and outside the classroom. They are also likely to have a negative view toward the educational process (Bandura, 1997).

Research on Teacher Efficacy

Teacher efficacy has been found to relate to many educational factors such as achievement of project goals, the number of changes a teacher makes, project resources, the continuation of new methods, student achievement, teaching strategies, and enthusiasm for instructional innovation. Teachers with a high sense of teacher efficacy are more likely to use a wide variety of student-centered teaching strategies while those with low teacher efficacy are more likely to use teacher-centered strategies. Those who have high teacher efficacy are more apt to take risks in the classroom and try new techniques (Swars, 2005). Early researchers of teacher efficacy indicated that teachers with high levels of efficacy believed that they were able to impact students' achievement and motivation (Fives, 2003; Tschannen-Moran, et al., 1998).

A study completed by Coladarci (1992) found that a teacher's personal and general efficacy were predictors of their commitment to classroom teaching, which

corroborates findings from other studies (Tschannen-Moran et al., 1998). This commitment to teaching was predicted more by general efficacy than by personal efficacy. In their study of 2,249 elementary and middle school teachers in Norway, Skaalvik and Skaalvik (2010) reported a negative relationship between teaching self-efficacy and teacher burnout.

Commitment to teaching was significantly related to the principal's role in school climate and teacher gender. Findings from multiple regression analyses indicated that both were significant predictors of commitment (Coladarci, 1992). Those findings are consistent with additional literature stating the leadership of an organization is related to teacher efficacy (Hora & Ferrare, 2012) and that productive principal behavior is associated with high teacher efficacy (Alijanian, 2012). Lee, Bryk, and Smith (1993) depicted a model showing that internal factors of a school's authority, which is how it operates and the disposition of the administration, and the school's social organization influenced teacher satisfaction and efficacy.

Contextual factors within a school may impact a teacher's sense of efficacy. Tschannen-Moran and Woolfolk Hoy (2007) examined additional factors that could influence teacher efficacy. They found significant relationships between teacher efficacy and teacher resources and between teacher efficacy and teacher satisfaction. They also found significant relationships between experienced teachers' efficacy and parental involvement and community support. School level results from this study were consistent with literature that the academic level of a school may impact a teacher's efficacy due to certification requirements, the organizational structure, school climate and the developmental level of students within schools of varying academic levels (Wolters &

Daugherty, 2007). Coladarci (1992) found that general efficacy was significantly related to teacher student ratio. Lee et al. (1993) reported that external factors such as type and number of students would influence teacher satisfaction and efficacy. Coladarci similarly indicated that efficacy could be indirectly related to the number of students. The work environment can have a significant impact on teacher efficacy (Alijinan, 2012). Many variables are related to teacher efficacy (Klassen et al., 2011), but often studies are based on the correlation between teacher efficacy and related variables, rather than the cause of those relationships (Fives, 2003). An additional facet is the idea that a teacher’s efficacy may be impacted by variables that cause it to change throughout their career.

Table 2.1
Studies Related to Teacher Efficacy

STUDY	PURPOSE	PARTICIPANTS	DESIGN	OUTCOMES
Fives (2003)	History of teacher efficacy, its correlates on motivation, achievement and teaching variables and how it relates to teacher knowledge	Review of TE over the years Good for historical sources		-Implications/Relevance – TE definitions are inconsistent, TE measurements vary, TE related to variables, but what is the nature of those relationships? A lot of the research is based on correlation, not causation. Outlines the need to figure out how to enhance teacher efficacy or to influence teacher efficacy -Highlights that efficacy is related to student achievement and motivation, teacher motivation, actions and decisions, innovation, knowledge, education level, college coursework and learning experiences
Giallo & Little (2003)	To examine the TE in classroom management in participants	54 elementary school teachers < 3 yrs. Experience and 25 interns in final year of education	Teachers were given instrument to measure TE in management (SEBM), preparedness (PrepCon) and perception of classroom	-TE was significantly correlated with preparedness -TE negatively correlated with severe behavior problems and positively correlated with manageable behavior problems -Teachers were found to report more preparedness than student teachers -Student teachers reported inadequate training in classroom

behavior

management

<p>Henson (2002)</p> <p>***Henson has some quotes about correlation, reliability and other stats from 2006/07 – google his website for sources – may need later – seems to be an expert on reliability and efficacy</p>	<p>To review the theoretical foundations of TE, review important findings in research that advance field, discuss measurements, and show underused methodologies</p>	<p>Review</p>	<p>behavior</p>	<p>-Implications/Relevance -TE is important in the classroom, as shown by research, but the research findings are confusing -Points to the need for qualitative research, not just self report surveys -Need to relate TE to CTE, because teachers do not operate as individuals, they operate as a whole -B/c of mostly correlational research, don't know whether TE is a cause or a consequence of good teaching -TE may not be changeable, bc of years of experience and bc PD is often external, not teacher led -TE research may be based on too many factors, which weakens the research (talking about the instruments used) -Points to need to move away from Likert scales and do qualitative research, such as "think alouds" to fully understand the sources of teacher efficacy by talking to teachers about why they answered like they did</p>
<p>Klassen, Tze, Betts & Gordon (2011)</p>	<p>To review all teacher efficacy research from 1998-2009</p>	<p>Looked in databases for all articles with words teacher(s) and efficacy, self-efficacy or collective efficacy. Narrowed to empirical studies with results based on pre-service or K-12 teachers. Out of 312, they used 218 articles over a 12 year period.</p>	<p>Compared findings from the previous 12 years, looked at descriptive stats of methodologies used – qualitative would help us learn more about how efficacy beliefs are shaped and changed. Looked at descriptive stats of domain specifics (what was studied), school level and geographic location, lack of CTE studies and</p>	<p>-Shows the need to relate TE to CTE since teachers do not work as individuals -6 Main needs in TE research 1. Need for qualitative research 2. Need to look at sources of TE 3. Measurements need to be generalizable, so not specific 4. Look internationally 5. Look at CTE 6. Fix measurement errors - Only 7 articles studied sources of teacher efficacy and there is not a good measurement out there</p>

measurement error problems

Skaalvik & Skaalvik (2010)	Test a new measure of TE; examine relationships between TE and CTE, burnout, satisfaction and beliefs	2249 elementary and middle school teachers in 113 schools in Norway	Measured TE using NTSES (Norway TSES) and CTE by their own scale, external control instrument, burnout instrument, satisfaction and school context in 6 questions	-NTSES was similar to other instruments in that TE is a multifaceted construct, but can be measured as one variable -External control was weakly, negatively correlated with TE and CTE -CTE was moderately correlated with TE -TE was negative correlated with teacher burnout -TE related to satisfaction; self-efficacy predicted higher satisfaction
Swars (2005)	Examine math teachers' perceived effectiveness with TE	4 elementary preservice teachers who just finished a course in math methods and how to teach math	24 days in elementary school teaching at least 3 lessons, took the MTEBI at the end, then interviews with each teacher	-Low math TE had negative past experiences with math; high math TE had positive past experiences with math -All believed they would be effective teachers, but low TE thought it would take more work for them to be successful -All believed they needed authentic instructional strategies that were useful to students; High TE were more comfortable with manipulatives

Changes in Teacher Efficacy

Changes in teacher efficacy beliefs are not well understood (Giallo & Little, 2003; Tschannen-Moran & Woolfolk Hoy, 2001a). Research studies focused on increasing teacher efficacy and high levels of efficacy based on successful experiences had varying results, which may mean that efficacy beliefs are difficult to change (Wheatley, 2005). According to the research, a teacher's efficacy could change during preservice years (Woolfolk & Hoy, 1990), but then stabilize over time once efficacy beliefs were established (Woolfolk Hoy, 2000) and as teachers gain more experience (Henson, 2002). In Turkey, 40 preservice teachers reported a decrease in teacher efficacy once they began

their student teaching and an increase in teacher efficacy at the completion of their student teaching (Yüksel, 2014). A study of 40 preservice teachers in Turkey The highest levels of teacher efficacy were found in the preservice years, while decreases in efficacy were reported upon graduation and entrance into the teaching profession (Woolfolk Hoy, 2000). Many preservice teachers believe they will be better teachers than their predecessors and that they will not have problems that other teachers face in the classroom (Pajares, 1992). Giallo and Little (2003) found that teacher efficacy decreases for a two-year period after graduation. Those teachers with more than six years of teaching experience had an improved level of teacher efficacy, yet it still remained lower than preservice levels. However, there may be changes or challenges that teachers faced that altered their efficacy beliefs (Tschannen-Moran & Woolfolk Hoy, 2001a).

Bandura (1994) stated that a person's self-efficacy can increase or decrease based on the reflection of mastery experiences. A person's emotions and moods can influence their beliefs in their own capabilities or lack thereof, which is the case when negative emotions and moods are present. An intense emotional reaction to an experience does not necessarily lower self-efficacy, but will if the emotions surrounding the event are stressful and negative (Bandura, 1994). A person's cognitive processes can also raise or lower their self-efficacy. When one weighs and interprets outcomes based on all other information present in a situation, this can shape one's efficacy beliefs. Efficacy beliefs can rise if someone leaves an event with a positive outlook and efficacy beliefs can lower if the outlook is negative (Goddard, 1998). Change in efficacy beliefs depends not on the situation itself, but on the cognitive and emotional process of the individual (Bandura,

1994; Goddard, 1998). Goddard also reported that change in teacher efficacy could lead to change in teaching practices.

Possible factors that could change a teacher's efficacy beliefs were change in leadership, change in context, and change in school characteristics such as climate, support systems and work relationships (Giallo & Little, 2003; Hoy, 2000; Tschannen-Moran & Woolfolk Hoy, 2001a). In one study, researchers reported that teacher efficacy decreased between summer and fall meetings, but increased throughout the school year. The increase in teacher efficacy was attributed to mastery experiences of teachers through their application of knowledge learned in professional development (Carleton, Fitch, & Krockover, 2008). Ross and Bruce (2007) reported similar changes in teacher efficacy after professional development. In their study, teachers were divided into a treatment and a control group with no significant differences at the beginning of the study. The treatment group received professional development based on Bandura's four sources of efficacy, while the control group did not receive the professional development until after the study was complete. The treatment group then implemented their professional development in the classroom and reconvened to reflect upon their experiences. A posttest was administered among the two groups and the treatment group reported increased teacher efficacy of classroom management. The researchers reported that the professional development increased the teachers' efficacy through mastery and vicarious experiences.

Hoy (2000) conducted a study of 53 preservice teachers to measure teacher efficacy to determine how it may change from preservice teachers to inservice teachers. She also studied the changes in efficacy in relation to contextual factors. Teacher

efficacy was measured with three different efficacy scales at the beginning of preservice education coursework, at the end of preservice education coursework and after the first year of teaching. Results from the Teacher Efficacy Scale (TES) and the Bandura's (2006) Teacher Self-Efficacy Scale (BTSES) used in the study indicated that efficacy rose within preservice teachers, but fell in the first year of teaching. Results from the third efficacy measure called the Ohio State University (OSU) confidence scale were the same, but not significant, which may indicate that the OSU confidence scale does not include items that are critical to a teacher's success in the classroom (Hoy, 2000).

The BTSES change scores were significantly correlated with change in scores of both other instruments, but Hoy (2000) acknowledged that a larger sample size would be needed to determine if the instrument was measuring teacher efficacy as intended. While the study began with 53 teachers, only 29 teachers completed the instrument at the end of their first year of teaching, which decreased the sample size. There was a significant relationship between teacher support and the BTSES score and the PTE subscale of the TES score, but this relationship was not significant with scores from the other instruments. A significant relationship was found between the GTE subscale of the TES scores and job satisfaction, but this relationship was not significant with scores from the other instruments. A significant, negative relationship was found between the OSU efficacy score and the number of sick days in the first year of teaching, but this relationship was not significant with scores from the other instruments. As indicated by results from all three instruments used in the study, teacher efficacy decreased in the first year of teaching (Hoy, 2000). Though inconsistent, there is some evidence from the

study that teacher efficacy may be related to job satisfaction, teacher support and number of sick days in the first year of teaching.

A similar study was conducted by Swan et al. (2011) that measured teacher efficacy in preservice teachers and first year teachers, however, they also measured teacher efficacy among the participants in the second and third years of teaching. Initially, 34 participants were included in the study, but only 17 of those participants entered the teaching field after graduation. Based on results from the preservice teachers' efficacy scores as measured by the Teachers' Sense of Efficacy Scale (TSES), those who entered the field had higher efficacy scores than those who did not, specifically on the student engagement subscale. Teacher efficacy decreased overall among the 17 participants during the first and second years of teaching, but rose almost to preservice levels in third year teachers. The subscales of the TSES were examined, which showed the same results in the instructional strategies and classroom management subscales. Scores from the student engagement subscales decreased between pre-service teachers' efficacy and first year teachers' efficacy, an increase in second year teachers' efficacy and another decrease in third year teachers' efficacy, which equaled the scores from the first year teachers (Swan, Wolf & Cano, 2011). Swan et al. were consistent with Woolfolk Hoy (2000) that teacher efficacy decreased upon entrance to the teaching profession, which indicated the need to learn more about how to foster and cultivate teacher efficacy among inservice teachers. Hoy's report that teacher efficacy increased among third year teachers was consistent with research that teacher efficacy is related to persistence in the field (Andreou & Rapti, 2010). However, the sample size decreased throughout Woolfolk Hoy's study, indicating that some teachers left the field, but it was

unknown from the study whether those who left had higher or lower teacher efficacy than those who remained in the profession. Because of the differences in teacher efficacy among the subscales of the TSES, there is a need for more research on the sources of teacher efficacy to determine why scores from this subscale are reportedly lower than scores from the other subscales (Woolfolk Hoy, 2000).

Putnam (2012) conducted a similar study of 484 new, experienced and preservice teachers to determine differences in teacher efficacy based on teacher experience, and he reported some similarities to the previous research, as well as some differences. Putnam reported no significant differences between preservice teachers that had not completed student teaching, preservice teachers that had completed student teaching and new teachers with less than three years of teaching experience. Putnam reported that overall, teacher efficacy was statistically the same for teachers with all three levels of experience (Putnam, 2012). In his study, Putnam used four different measures of teacher efficacy, which was consistent with other research that experiences do increase efficacy (Bandura, 1994). Putnam reported that teacher efficacy, as measured by the TSES, was significantly higher among experienced teachers than the efficacy scores measured by the TSES in the other three groups. However, his findings were inconsistent with findings from similar research (Woolfolk Hoy, 2000; Swan et al., 2011). Woolfolk Hoy used different instruments than Putnam to measure teacher efficacy, but Swan et al. used the same instrument and reported different results. Within Putnam's research, he used different instruments to measure teacher efficacy and reported different results. Swan et al. (2011) used the TSES instrument, which was the same measure as Putnam and reported different results. There are many measures of teacher efficacy, which may

weaken the research on teacher efficacy (Henson, 2002) and is an area where clarification is needed for better teacher efficacy research (Klassen et al., 2011).

Table 2.2

Studies Related to Changes in Teacher Efficacy

STUDY	PURPOSE	PARTICIPANTS	DESIGN	OUTCOMES
Carelton, Fitch & Krockover (2008)	To examine changes in TE over a year	30 science teachers, varying levels of experience	Completed the STEBI at beginning and end of course and 2 other instruments about attitudes and beliefs in teaching science.	-At beginning of program, teachers drew on all 4 sources of efficacy. As year went on, drew less on vicarious and persuasion, but mastery experiences were stronger. -High efficacy in summer, lowered between summer and fall (doubting their abilities) but raised again during fall and spring -Implications/Relevance – TE can change over the course of a school year; mastery experiences don't seem to fade over the year
Giallo & Little (2003)	To examine the TE in classroom management in participants	54 elementary school teachers < 3 yrs. Experience and 25 interns in final year of education	Teachers were given instrument to measure TE in management (SEBM), preparedness (PrepCon) and perception of classroom behavior	-TE was significantly correlated with preparedness -TE negatively correlated with severe behavior problems and positively correlated with manageable behavior problems -Teachers were found to report more preparedness than student teachers -Student teachers reported inadequate training in classroom management -Implications/Relevance
Henson (2002)	To review the theoretical foundations of TE, review important findings in research that advance field, discuss measurements, and show underused methodology	Review		-TE is important in the classroom, as shown by research, but the research findings are confusing -B/c of mostly correlational research, don't know whether TE is a cause or a consequence of good teaching -TE may not be changeable, bc of years of experience and bc PD is often external, not teacher led

gies

Hoy (2000)	Study changes in teacher efficacy from pre-service teachers into the first year of teaching	29 teachers who completed student teaching and first year of teaching	Completed the TES (Gibson & Dembo), the Bandura TE scale and the OSU Teaching Confidence Scale – made for this study. During 1 st quarter of coursework, after student teaching and after one year.	-Increase in all 3 scales from 1 st to 2 nd time, decrease in all 3 from 2 nd to 3 rd time (OSU confidence scale not significant) -Correlated TE to contextual factors – 1 success 2 satisfaction 3 difficulty 4 support 5 SES of class 6 attendance. 2 correlated with TE from TES and Bandura scale. 1 did not correlate. 4 was correlated with all scales. 6 correlated on OSU scale
Hoy & Spero (2005)	Study the changes in teacher efficacy from a pre-service teacher into the early years of teaching	53 Master’s teachers in certification program; 29 after one year of teaching	Longitudinal study Given instruments at beginning and end of certification program and then again after one year of teaching; given BTSES, Gibson & Dembo and OSU Confidence Scale	-Increase in TE during student teaching. Decrease in TE during 1 st year teaching. Decrease to support. -Seems to be the same study as the one above
Putnam (2012)	To compare TE of preservice and inservice teachers	484 undergraduate and graduate education students	Long form TSES; 4 groups 1 – juniors with no teaching experience 2-seniors who completed student teaching 3-new teachers 4- experienced teachers with more than 3 years	The experienced teachers showed higher levels of TE than all other groups.
Ross & Bruce (2007)	To determine if professional development based on Bandura’s theory could increase teacher efficacy	106 6 th grade teachers in one district	Control and treatment group randomly assigned, treatment rcvd PD, at beginning, implemented in classroom and shared with peers, control at end. Also tested groups with other measures to determine if groups were equal.	-Groups were shown to have no significant differences at beginning of study -PD increased TE in classroom management; study suggests that instructional strategies and engagement would follow management -Findings support the change model through mastery experience and vicarious experience -Implications/Relevance – good model about teacher change through self-assessment; good literature about TE being able to change (original source Ross et al 1997) directly related to 4 sources

Swan, Wolf & Cano (2011)	Examine changes in TE from pre-service teachers to 3 rd year of teaching	17 teachers who completed student teaching and joined the profession	Longitudinal study Given TSES after student teaching and after 1 st , 2 nd and 3 rd year of teaching	<p>of efficacy</p> <ul style="list-style-type: none"> -Supports use of TSES as the new standard and gives reasons why (p. 53) -Sharing experiences with peers – redefined success. -Highest levels of TE after student teaching, lowest after first year of teaching; student engagement the lowest of the subscales -Implications/Relevance – good model for TE p.130; TE can change over time
Wheatley (2005)				<ul style="list-style-type: none"> -Studies aimed at increasing teacher efficacy to increase student achievement have had mixed results (both in increasing efficacy and increasing achievement) -Efficacy may only be able to increase after success, not before. -Efficacy based on previous success is resistant to change -Some really good ideas for future research.

Measures of Teacher Efficacy

Measurements of teacher efficacy have been based on both Rotter's (1966) locus of control theory and Bandura's (1977) social cognitive theory. According to the research, teacher efficacy was based on a teacher's own self-efficacy, or the ability to meet one's own performance goals. This has led to differing concepts of teacher efficacy, which presents the issue of whether teacher efficacy can truly be measured by a single efficacy instrument (Tschannen-Moran et al., 1998).

Teacher efficacy was first measured using a two-item instrument created by the Rand Corporation (Armor, Conry-Oseguera, Cox, King, McDonnell, Pascal, Pauly & Zellman, 1976; Tschannen-Moran et al., 1998). Early instruments were based on Rotter's (1966) theory of locus of control, but later instruments were based on Bandura's (1977)

social cognitive theory. These instruments have strengths and weaknesses and were rooted in differing theories, but have nonetheless been used to contribute to the field of teacher efficacy research, which led to some confusion in the area of teacher efficacy (Tschannen-Moran et al., 1998).

In 1976, the Rand Corporation reported on reading programs in minority Los Angeles schools by adding two items to a teacher questionnaire (RAND) regarding teachers' beliefs in their ability to impact learning (Armor et al., 1976). This was the first time the idea of teacher efficacy was measured (Tschannen-Moran et al., 1998). The first RAND item measured GTE. The first item stated, "when it comes right down to it, a teacher really can't do much because most of a student's motivation and performance depends on his or her home environment" and teachers indicated their level of agreement with this statement. The second RAND item measured PTE. The second RAND items stated, "If I try really hard, I can get through to even the most difficult or unmotivated students" and teachers indicated their level of agreement with this statement. The sum of the two items measured teacher efficacy or the extent to which a teacher believed they had internal control of student achievement and motivation. As research in teacher efficacy increased, so did the hunt for a better measure of teacher efficacy, which led to the creation of three new measures of teacher efficacy based on Rotter's (1966) original idea of locus of control (Tschannen-Moran et al., 1998).

The 28-item Teacher Locus of Control instrument was developed in 1981. Half of the items on this instrument described student successes and half of the items described student failures. For the student success items, teachers were to indicate a positive response if the responsibility was internal to the teacher and a negative response

if the responsibility was external to the teacher. For the student failure items, teachers were to indicate a negative response if the responsibility was internal to the teacher and a positive response if the responsibility was external to the teacher. This measure had a weak, but significant relationship with both facets of the RAND measure, as well as the summed score of the RAND measure. Additional examination between the two instruments found that teachers who internalized successes and failures had higher efficacy than teachers who externalized student successes and failures (Tschannen-Moran et al., 1998).

Guskey developed the 30-item Responsibility for Student Achievement in 1981 (Guskey, 1987; Tschannen-Moran et al., 1998). To answer the items, teachers had a scale of 100 percentage points to indicate whether an event was caused by a teacher or by a student. The instrument was supposed to measure the amount of responsibility that teachers assumed for overall student results and more specifically, the amount of responsibility assumed by teachers for student success and for student failure. The scores were significantly, positively correlated with the RAND measure. A test of the intercorrelations of the instrument showed strong, significant relationships between teacher's overall assumption of responsibility for outcomes and the responsibility assumed by teachers for student success and for student failure (Tschannen-Moran et al., 1998).

A third measure of teacher efficacy was also developed called the Webb Efficacy Scale. The Webb Efficacy Scale consisted of seven items where teachers were given two items and had to make a choice which statement they agreed with the most. Based on the results from the use of this instrument, researchers indicated that teachers with higher

scores were associated with instructional methods that were less influenced by negativity. The search for the best instrument to measure teacher efficacy continued and subsequent measures based on Bandura's (1977) self-efficacy theory were created (Tschannen-Moran et al., 1998).

The 30-item TES was developed in 1984, which measured two factors (Gibson & Dembo, 1984). PTE was the first factor and was intended to reflect a teacher's self-efficacy and GTE was the second factor, which was intended to reflect a teacher's outcome expectations. Factor loading results matched the PTE and GTE on the TES with those on the RAND measure (Tschannen-Moran et al., 1998). However, further analysis on this instrument indicated that some items were loaded with both factors, PTE and GTE (Gibson & Dembo, 1984). The instrument was ultimately shortened because of the duplicate factor loadings. The TES decreased to a 10-item instrument where the factors PTE and GTE are each represented by five items and research has continued to show inconsistencies with the instrument's results (Tschannen-Moran et al., 1998).

Additional measures of teacher efficacy were created based on specific content areas and specific contexts. An instrument was developed called the Science Teaching Efficacy Belief Instrument, which was intended to measure efficacy as it related to teaching science. The Ashton Vignettes was an instrument that described hypothetical situations where teachers could indicate how effectively they could perform in that situation. This instrument was created based on the idea that teacher efficacy is specific to certain situations (Tschannen-Moran et al., 1998).

Bandura's (2006) BTSES was a 30-item instrument that measures six subscales (1) efficacy to influence decision making, (2) instructional efficacy, (3) disciplinary

efficacy, (4) efficacy to enlist parental involvement, (5) efficacy to enlist community involvement, and (6) efficacy to create a positive school climate. The original version of this scale was intended to measure teacher efficacy, but not so specifically that it was not generally applicable in practice. However, the researchers indicated that some items on the scale were not an accurate portrayal of a typical teacher's work experience and therefore the scale is problematic (Tschannen-Moran & Woolfolk Hoy, 2001a).

The lack of an adequate measurement of teacher efficacy led to the development of the TSES, created by Tschannen-Moran and Woolfolk Hoy (2001a). The TSES, formerly known as the Ohio State teacher efficacy scale (Tschannen-Moran & Woolfolk Hoy, 2001b), was created due to the need for a valid and reliable measure of teacher efficacy (Tschannen-Moran et al., 1998). The exploration of a new instrument began with a seminar of ten people, including two researchers, four practicing teachers, two teacher educators and two doctoral candidates. The group decided to use a nine-point scale with five anchors, similar to the scale used in the BTSES (Tschannen-Moran & Woolfolk Hoy, 2001a). Some items from BTSES were used and each member of the seminar developed up to ten additional items for the instrument. Out of more than 100 items, 52 were kept, 23 of which were from the BTSES and those 52 were intended to identify a complete measure of a typical teaching experience. The scale was then used in three separate studies and the resulting scale after revision was a 24-item long form instrument and a 12-item short form instrument. The TSES measured three subscales, which were the efficacy for (1) student engagement, (2) instructional strategies, and (3) classroom management (Tschannen-Moran & Woolfolk Hoy, 2001a). The TSES has

since been used in studies regarding the measure of teacher efficacy (Hicks, 2013; Oh, 2011).

Table 2.3

Studies Related to Measures of Teacher Efficacy

STUDY	PURPOSE	PARTICIPANTS	DESIGN	OUTCOMES
Gibson & Dembo (1984)	To create instrument to measure teacher efficacy based on Bandura's locus of control theory			-Overall points to the need for a better teacher efficacy scale
Henson, Kogan & Vachahaase (2000)	To determine measurement error in teacher efficacy instruments			-Specifically talks about the TES scale by Gibson and Dembo -Source is one year prior to the development of the TSES scale
Lee, Bryk & Smith (1993)	A review of effective practices within schools.	Review		-Model of school organization: teacher outcomes such as efficacy are impacted by external (students, parents) and internal (leadership, workplace, work relationships) factors
Tschannen-Moran, Hoy & Hoy (1998)	Overview of TE; What it means and how it is measured. Reviewed each measure of TE that had been used in research	Sample of teachers – looked at previous research	Studied correlates of each TE measure.	-RAND & Gibson & Dembo $r = .64$; Gibson & Dembo & TLC scale $r=.47$; & Guskey scale $r=.57$ – all related, but not perfectly, so what else are they measuring? -Propose that TE is cyclical. Model on p228 about sources of teacher efficacy and how they are shaping and being shaped. Authors refer to this as an integrated model. Pose that sources are shaped by how teachers analyze the task of teaching. Pose need to test the model.

STUDY	PURPOSE	PARTICIPANTS	DESIGN	OUTCOMES
Tschannen -Moran & Hoy (2001a)	Develop new measure of TE – the TSES Review all of the previous scales and the problems with the measuremen ts	3 studies where the new instrument was tested	2 researchers and 8 grad students decided on format of new scale, ultimately chose one based on Bandura’s previous scale, but altered -Tested 52 items with 224 teachers (146 pre and 78 current), narrowed to 32 after factor analysis; Tested 32 items with 217 teachers (70 pre and 147 current), narrowed to 18 after factor analysis, revised classroom management subscale b/c it was weak, but the panel thought it was important; Tested 36 items with 410 (103 pre and 255 current), narrowed scale to 24. Reliability high on each subscale.	-Discuss development of efficacy beliefs -Changed the final form to have a short form option. After more research, findings indicate that the short form or the long form capture the construct of teacher efficacy.
Tschannen -Moran & Woolfolk Hoy (2001b)	Instrument widely used to measure TE			-Copy of the instrument TSES

Demographic and Contextual Factors

Teacher efficacy and its related factors have a relationship similar to Bandura’s (1986) theory of triadic reciprocal determinism (Goddard, 1998; Pajares, 1996). In the theory of triadic reciprocal determinism, personal and environmental factors can influence efficacy and the strength of those factors is unknown. Depending on the situation, the environment may influence efficacy more than personal factors, but it is just as likely that an individual’s personal factors could more strongly influence efficacy.

Because personal factors and the environment are influences of efficacy, it is important to gain more understanding of the personal and environmental factors related to teacher efficacy and determine how they shape efficacy beliefs (Goddard, 1998).

Personal factors could influence a teacher's efficacy beliefs (Bandura, 1986). Demographic factors, which are unique to the teacher, factors could possibly influence a teacher's sense of self-efficacy according to previous research (Bakar, Mohamed & Zakaria, 2013; Tschannen-Moran & Woolfolk Hoy, 2007; Usher & Pajares, 2008b). A teacher's age (Bakar, Mohamed & Zakaria, 2013; Chin et al., 2013; Tschannen-Moran and Woolfolk Hoy, 2007), gender (Chin et al., 2013; Klassen & Chiu, 2010; Tschannen-Moran and Woolfolk Hoy, 2007), race (Chin et al., 2013; Tschannen-Moran and Woolfolk Hoy, 2007), level of education (Fives, 2003; Chin et al., 2013) and years of experience (Chin et al., 2013; Giallo & Little, 2003; Klassen & Chiu, 2010, Tschannen-Moran & Woolfolk Hoy, 2001a; Tschannen-Moran & Woolfolk Hoy, 2007; Woolfolk Hoy, 2000) could impact the formation of efficacy beliefs. There is a need to further explore how demographic variables influence teacher efficacy.

A teacher's environment, or the context in which they teach, is outside of the teacher's control (Morris, 2010). Tschannen-Moran and Woolfolk Hoy (2007) stated that efficacy beliefs of teachers are specific to the context in which they teach. Contextual factors at the school level linked to teacher efficacy are collective teacher efficacy (Bandura, 1997; Calik et al., 2012; Goddard, Hoy & Woolfolk Hoy, 2004; Klassen et al., 2010; Tschannen-Moran & Woolfolk Hoy, 2007) school climate (Giallo & Little, 2003; Tschannen-Moran & Woolfolk Hoy, 2007), school leadership (Alijinan, 2012; Calik et al., 2012; Chin et al., 2013; Giallo & Little, 2003; Tschannen-Moran & Woolfolk Hoy,

2001a; Tschannen-Moran & Woolfolk Hoy, 2007; Woolfolk Hoy, 2000), teacher satisfaction (Goddard, Hoy & Woolfolk Hoy, 2004; Klassen 2010; Klassen & Chiu, 2010), teacher stress (Klassen & Chiu, 2010), trust (Goddard, Hoy & Woolfolk Hoy, 2004), openness (Goddard, Hoy & Woolfolk Hoy, 2004), professional development (Carleton et al, 2008; Ross & Bruce, 2007) and availability of resources (Tschannen-Moran & Woolfolk Hoy, 2007). Classroom specific factors (Tschannen-Moran & Woolfolk Hoy, 2007), which have not been heavily researched (Giallo & Little, 2003), are variables that could impact teacher efficacy. The content area (Tschannen-Moran & Woolfolk Hoy, 2007), teacher preparedness (Giallo & Little, 2003), class size (Klassen and Chiu, 2010; Tschannen-Moran & Woolfolk Hoy, 2007), class type (Klassen and Chiu, 2010; Tschannen-Moran & Woolfolk Hoy, 2007), student behavior (Giallo & Little, 2003), classroom diversity (Giallo & Little, 2003), student SES (Giallo & Little, 2003), student age (Giallo & Little, 2003), and student race (Giallo & Little, 2003) have the potential to influence a teacher's efficacy beliefs. Teacher efficacy can vary depending on the situation in which they teach (Milner & Woolfolk Hoy, 2003), content area and the individual teacher (Henson, 2002). Based on the research, there are inconsistencies of how teacher efficacy is influenced by contextual factors. Therefore, there is a need to continue to study contextual factors to better understand their relationship to teacher efficacy.

Teacher Experience

Coladarci's (1992) results on leadership effects on efficacy differed from those results reported by Tschannen-Moran and Woolfolk Hoy (2007) in their study of factors that influenced teacher efficacy. Tschannen-Moran and Woolfolk Hoy used the TSES

instrument to measure the teacher efficacy of 255 new and experienced teachers at elementary, middle and high school, while Coladarci used the TES instrument to measure the teacher efficacy of 364 elementary school teachers. Both studies used self-reporting procedures from the participants, so it is likely that both studies have some bias in the types of teachers who would be willing to self-report.

Tschannen-Moran and Woolfolk Hoy (2007) examined teacher efficacy and additional influential factors of new and experienced teachers. They found a significant difference between new and experienced teachers' teacher efficacy, with experienced teachers having higher levels of teacher efficacy. They also found significant relationships between experienced teachers' efficacy and parental involvement and community support. They used hierarchical regression analysis and revealed that school level was also a contextual factor that contributed to teacher efficacy, but this was only the case with experienced teachers. However, no significant relationship was reported between teacher experience and teacher efficacy for new or experienced teachers. Coladarci (1992) found no significant relationship between teacher experience and GTE or PTE, however, he did report that general efficacy was significantly related to teacher student ratio, which was significantly related to teacher experience.

Alijanian (2012) also reported significant differences in teacher efficacy between experienced and inexperienced teachers with less than five years of experience. The experienced teachers reported higher efficacy levels. Putnam (2012) also reported significant differences in efficacy between experienced teachers and all other teachers, including novice teachers with less than three years of experience and preservice teachers at differing stages in their teacher education coursework. Tajeddin & Khodaverdi (2011)

conducted a study of 59 Iranian teachers that reported higher levels of teacher efficacy among experienced teachers as measured by the Teachers' Efficacy Beliefs System-Self Form (TEBS-Self). However the differences were not significant except in the subscales of communication and accommodating individual student differences. Wolters and Daugherty (2007) conducted a study of 1,024 teachers from kindergarten through twelfth grade levels. A moderate difference in teacher efficacy was found among teachers of varying experience levels, with lower teacher efficacy levels among those with the least experience.

In a 2010 study completed by Klassen and Chiu, the teacher efficacy of 1,430 teachers of all grade levels in Western Canada was measured using the TSES. As years of experience increased, so did teacher efficacy on all three subscales of the instrument (1) teaching strategies, (2) classroom management, and (3) student engagement. This increase was gradual but steady, and peaked between 20 and 25 years of experience and then fell as steadily as it had risen with each subsequent year of experience. It is unclear whether teacher efficacy differed between preservice and inservice teachers (Giallo & Little, 2003). Due to the differences in research results, there is a need to test teacher level demographic variables and their influence on teacher efficacy.

Teacher Gender

Coladarci (1992) reported that gender was significantly related to general efficacy and personal efficacy, as measured by the TES instrument. In a study of 40 Iranian English teachers, both from public high schools and private institutions, the teacher efficacy between males and females was significantly different, with the female teachers having higher efficacy (Alijinar, 2012), which was consistent with Coladarci's findings.

In a study of 59 English as a foreign language teachers, male teachers were found to have higher efficacy levels than female teachers, as measured by the TEBS-Self Form. While results were higher for males overall, the differences in teacher efficacy were only significant on the subscale of student motivation (Tajeddin & Khodaverdi, 2011). On the other hand, Tschannen-Moran and Woolfolk Hoy (2007) found no significant relationship between teacher gender and teacher efficacy among new or experienced teachers.

Education level

Pre-service teachers are often the participants in teacher efficacy research (Can, 2015; Oh, 2010; Oh, 2011; Yuksel, 2014) and there is a possibility that teacher efficacy changes throughout a teacher efficacy program (Yuksel, 2014). One teacher reported an increased sense of teacher efficacy based on obtaining a doctorate degree (Milner and Woolfolk Hoy, 2003). In Kahyaoglu 's (2011) qualitative study, one participant stated that an increased sense of efficacy came from extensive preparation from college courses on the subject taught in her classroom. Ross and Bruce (2007) found that increased content knowledge improved teacher efficacy. It is possible that further education could influence a teacher's efficacy.

Race

Race can be an influential factor of a teacher's efficacy, as Milner and Woolfolk Hoy (2003) stated. In their qualitative study, an African American teacher reported a negative physiological affect due to combating race related stereotypes from students, parents and colleagues. Two additional studies examined the relationship between race

and self-efficacy (Bloom & Peters, 2012; Olsen, 2008). In a study conducted by Olsen (2008), teacher efficacy scores were examined in relationship to the racial makeup of the students, the socioeconomic status and the prior achievement levels of the school. Although the schools differed in achievement levels as well as the demographics of the students, no significant differences in teacher efficacy were reported (Olsen, 2008). However, Bloom and Peters (2012) conducted a study of preservice teachers where the TSES was used to measure teacher efficacy. Teacher efficacy scores decreased in the areas of instructional strategies and classroom management as the number of non-White students in the classroom increased (Bloom & Peters, 2012). The number and type of students could influence teachers' sense of efficacy (Lee, et al., 1993). Based on these two studies, it remained unclear whether race influenced teachers' efficacy.

Table 2.4

Studies Related to Demographics and Contextual Factors

STUDY	PURPOSE	PARTICIPANTS	DESIGN	OUTCOMES
Alijina (2012)		40 English teachers in Iran 20 from public school and 20 from private school	TSES given to teachers and open ended questionnaire given to those who volunteered	-Principal leadership, school conditions, access, student characteristics -Those who work with young students and high socioeconomic students have higher efficacy -Gender, experience and public/private schools had significant impact on teacher efficacy (Higher for females, higher for experienced teachers and higher for private school)
Coladarc i (1992)	To determine the how TE predicts commitment to teaching	170 teachers, instrument mailed to 364 teachers	Teachers given instrument to measure commitment to teaching, TE – Gibson and Dembo, and to measure school climate	No relationship between TE and teacher experience. Gender was significantly related to PTE and general efficacy.

Lee, Bryk, & Smith (1993)	A review of effective practices within schools.	Review			-Model of school organization: teacher outcomes such as efficacy are impacted by external (students, parents) and internal (leadership, workplace, work relationships) factors
Milner & Woolfolk Hoy (2003)	To determine sources of efficacy that supported her and encouraged her to stay, even though she was in unsupportive environment . To determine how stereotype threat affected her.	1 African American teacher in suburban high school	Qualitative case study	Observations and interviews, both formal and informal	-Isolation from peers has threatened her efficacy and caused her to question herself – physiological and emotional arousal, but these were not overwhelming. -Mastery experiences – helped her, even though she never mastered them bc they were not masterable; had to rely on past teaching experiences and past personal mastery experiences -Context matters b/c in a different context, she would have different views.
Tajeddin & Khodaverdi (2011)	To examine TE beliefs and how they are impacted by gender, experience and education	59 teachers	TEBS-Self instrument		-Teacher efficacy was not related to gender, experience or educational background.
Wolters & Daugherty (2007)	To examine TE and its relationship to experience and education	1024 teachers at all grade levels	Instrument – TSES and part of the adaptive learning scale		-TE was found to be moderately different at different grade levels -Low TE in those teachers with little experience -Good source for teachers self-reporting

Sources of Teacher Efficacy

Mastery experiences, vicarious experiences, verbal persuasions and a person's physiological state are the primary sources of efficacy (Bandura, 1977). However, little is known about the practical sources of efficacy that shape teachers' efficacy (Oh, 2011).

There is a need to learn more about the sources of efficacy related to the practice of teaching and how those sources shape a teacher's sense of efficacy.

Research on Sources of Teacher Efficacy

Mastery Experiences

Bandura (1997) stated that mastery experiences are the most influential source of teacher efficacy. Educational researchers have conducted studies, both qualitative (Can, 2015; Hand & Stuart, 2012; Kahyaoglu, 2011; Milner, 2002; Milner & Woolfolk Hoy, 2003; Morris & Usher, 2011; Ross & Bruce, 2007; Yüksel, 2014) and quantitative (Hand & Stuart, 2012; Maw & Swe, 2011; Mohamedi & Asadzadeh, 2012; Mohamedi, Asadzadeh, Ahadi & Jomehri, 2011; Morris, 2010; Oh, 2011; Tschannen-Moran & Woolfolk Hoy, 2007; Tschannen-Moran and McMaster, 2009; Yüksel, 2014) and their results mostly support Bandura's social cognitive theory. In 2011, Oh conducted a quantitative study of 43 preservice teachers and her results stated that enactive mastery experiences predicted efficacy for classroom management. Results from Oh's study were based on TSES surveys and the Teaching Efficacy Sources Inventory measure. Maw and Swe (2011) also reported that mastery experiences were significantly correlated with teacher efficacy and were a significant predictor of teacher efficacy in their quantitative study of 500 student teachers in Myanmar. Mohamedi and Asadzadeh (2012) reported mastery experiences as a dominant source of teacher efficacy in their study of 284 Iranian high school teachers. In a separate study, Morris (2010) reported none of the four sources of efficacy predicted efficacy of classroom management for inservice teachers (Morris, 2010), which was in direct contrast to the results presented by Oh (2011) regarding pre-service teachers' efficacy. Based on results from the research, Oh (2011)

also suggested that one of two personality traits may be correlated with highly efficacious teachers (1) an achievement-oriented teacher who is dominant in the classroom and intelligent, or (2) an interpersonal-oriented teacher who is supportive, not authoritative and not defensive. Based on the study, Oh found that motivation and capability improve teacher efficacy in preservice teachers and their sense of teacher efficacy was partially due to observing student learning, confidence in handling classroom matters and their own teaching (Oh, 2011). Researchers who have performed qualitative studies have also reported mastery experiences to be an influential source of teacher efficacy.

In a qualitative study of college instructors, researchers conducted interviews with award winning professors who indicated that mastery experiences were one of the most important sources of self-efficacy. Mastery experiences were reported as perceived successes in instruction, content and instructional mastery, and student progress (Morris & Usher, 2011). Yüksel (2014) reported that enactive mastery experiences were the most influential among preservice teachers while student teaching. Milner and Woolfolk Hoy (2003) described the mastery experiences of one African American teacher in their qualitative case study. The teacher set a teaching goal, which she perceived to be unattainable and stated that it likely influenced her efficacy because she never had confidence that she would achieve mastery due to the fact she could never reach her goal. Kahyaoglu (2011) conducted a qualitative study using interviews of three experienced science teachers to learn more about the sources of teaching self-efficacy of science teachers. The teachers reported that problem solving, student interest and experiments, which relate to mastery experiences, increased their teacher efficacy. Lack of student understanding and interest, lack of prior student knowledge, problem students and

problems within the classroom contributed to decreased self-efficacy among the teachers. These factors also related to mastery experiences. Can (2015) also conducted a qualitative study of science teachers, only those teachers were preservice teachers. Based on interviews with the five participants, Can reported that mastery experiences were the most influential source of teacher efficacy. The participants' responses included influences from each of the four sources of teacher efficacy, however, verbal persuasion, vicarious experience and physiological and affective states were embedded within the preservice teachers' mastery experiences. Hand and Stuart (2012) reported similar results in their qualitative study of physical education teachers. They interviewed 15 physical education teachers who were just beginning their teaching career. Mastery experiences and help from mentor teachers impacted their teaching self-efficacy, as indicated by the interview responses.

Mastery experiences have also been embedded in professional development, which has been the focus of two research studies (Ross & Bruce, 2007; Tschannen-Moran & McMaster, 2009). Tschannen-Moran and McMaster measured teacher efficacy after implementation of a professional development model rooted in Bandura's four sources of teacher efficacy. Teacher efficacy increased significantly when mastery experiences in the form of teachers practicing their newly learned strategies were implemented in the professional development model. Ross and Bruce reported no gains in teacher efficacy through mastery experiences based on implementing strategies learned in professional development. The mastery experiences in their study came in the form of content knowledge, teacher learning and practice in the classroom, collaborating with peers, reflecting and getting feedback on their teaching. Additionally, success was not

defined as how many answers students got correct. A successful mastery experience in their study was defined by depth of knowledge, how much students worked to build their knowledge and how well students were able to express what they learned. When the professional development program implemented in Tschannen-Moran and McMaster's study included mastery experiences combined with verbal persuasion, substantial increases in teacher efficacy were reported, while the professional development in Ross and Bruce's study focused very little on verbal persuasion as a source of efficacy. Verbal persuasions can be influential sources of teacher efficacy (Milner, 2002) as well as mastery experiences (Hand and Stuart, 2012; Kahyaoglu, 2011; Morris & Usher, 2011; Oh, 2011; Tschannen-Moran and McMaster, 2009).

Verbal Persuasions

Bandura (1997) stated that verbal persuasions were one of the least influential sources of teacher efficacy, due to the lack of experience involved in another's feedback or suggestions. Educational researchers have not found this to be the case. In Oh's quantitative study, she reported verbal persuasions to be a significant predictor of teacher efficacy for preservice teachers. In a study of 56 college level instructors, Hora and Ferrare (2012) also reported that support from peers and the community, as well as feedback on performance from parents or students can shape efficacy beliefs. There is a need to determine these sources of efficacy for inservice teachers. Morris (2010) conducted a quantitative study to determine the sources of teacher efficacy. He reported that verbal persuasion was the only significant predictor efficacy for instructional strategies. Similar results have been reported in qualitative studies. Mohamedi and

Asadzadeh (2012) also reported verbal persuasions as a strong influence of teacher efficacy.

Through interviews with award winning professors, Morris and Usher (2011) reported that college instructors indicated verbal persuasions as one of the most influential sources of self-efficacy. Examples of verbal persuasions were reported as student feedback, awards in teaching and peer interactions. Yüksel (2014) reported verbal persuasion as an influential source of teacher efficacy for preservice teachers during their student teaching experience. Those verbal persuasions were in the form of advice and encouragement from mentors and feedback and support from their own peers. In Milner's (2002) case study, verbal persuasion in the form of student and parental feedback was regarded by one experienced teacher as the source of efficacy with the strongest influence. Kahyaoglu's (2011) reported lack of student understanding and interest, lack of prior student knowledge, problem students and problems within the classroom contributed to decreased self-efficacy among teachers. Some of these factors were related to verbal persuasions.

When Tschannen-Moran and McMaster (2009) measured teacher efficacy after implementation of professional development based on Bandura's (1997) four sources of teacher efficacy, they found substantial increases in teacher efficacy when verbal persuasion was combined with mastery experiences in professional development. Many researchers have reported verbal persuasions to be an influential source of efficacy, despite Bandura's (1997) social cognitive theory. Few researchers have also reported on vicarious experiences as a source of efficacy (Kahyaoglu, 2011; Tschannen-Moran & McMaster, 2009)

Vicarious Experiences

Vicarious experiences are the second most influential source of efficacy (Bandura, 1997). Little evidence exists within educational research to support vicarious experiences as a strong source of teacher efficacy. Maw and Swe (2011) reported vicarious experiences to be significantly correlated with teacher efficacy as well as a significant predictor of teacher efficacy in student teachers in Myanmar. Tschannen-Moran and McMaster (2009) reported no change in teacher efficacy when vicarious experiences were implemented within professional development as did Ross and Bruce (2007). Each of the aforementioned researchers implemented vicarious experiences in a different way within the professional development. Tschannen-Moran and McMaster spent 20 minutes letting the participants watch a presenter successfully use the professional development strategies in teaching reading to a group of students. Ross and Bruce also had participants watch successes as shown by experienced teachers as a form of vicarious experience. They added sessions where participants discussed others' successes and showed the participants research of how their new strategies would lead to higher academic success as two additional types of vicarious experiences that may impact teacher efficacy. Despite the differences in implementation of vicarious experiences through professional development in each research study, vicarious experiences did not influence teacher efficacy. Kahyaoglu (2011) reported that vicarious experiences in the form of teacher comparisons had little impact on science teachers' efficacy in his qualitative study, but that the enthusiasm of fellow teachers may positively influence another teacher. Measuring the impact of vicarious experiences on teacher efficacy is scarcely found in research studies and minimally affects teacher efficacy, if at all, based

on the previously discussed studies, which is similar to the final source of teacher efficacy, physiological and affective states.

Physiological and Affective States

Physiological and affective states are the least influential source of teacher efficacy. Educational researchers have reported varying results. Oh (2011) reported that preservice teachers' physiological state predicted their efficacy for classroom management. In a case study completed by Milner and Hoy (2003), they found that physiological and affective states in the form of isolation and lack of acceptance from peers did influence one teacher's sense of efficacy. In contrast, Kahyaoglu (2011) found that teachers' physiological states had almost no impact on teacher efficacy. Educational research is not abundant on this source of efficacy, quite possibly due to its weak impact on teacher efficacy.

Measuring Sources of Teacher Efficacy

Information about outcomes related to teacher efficacy and variables correlated to teacher efficacy were abundant, but less was known about the formation of teacher efficacy beliefs (Gibbs & Miller, 2014). Morris and Usher (2011) conducted a qualitative study to learn more about the formation of a teacher's efficacy beliefs. In their study, they conducted interviews with a racially diverse sample of award winning professors to determine the weight that each professor placed on Bandura's (1977) four sources of self-efficacy. The professors were then asked to give examples of the experiences they have had that related to the four sources of self-efficacy by recollecting past experiences. The researchers used a script when conducting interviews, which were approximately 90

minutes in length for each professor. Results from the study indicated the professors were most influenced by mastery experiences and verbal persuasion. However, the mastery experiences that formed the efficacy beliefs among professors varied (Morris & Usher, 2011). Additionally, Yüksel (2014) reported that physiological and affective state, mostly in the form of fear, impacted teacher efficacy among preservice teachers during their student teaching, but the influence was temporary and could be controlled by the preservice teachers.

In 2010, Morris completed a study where he used an eight-part survey to gain more information about teaching efficacy. The eight parts of the survey were (1) TSES short form, (2) teacher satisfaction, (3) teacher stress, (4) collective teacher efficacy, (5) recognition of self and others, (6) optimism, (7) authenticity, and (8) Sources of Teacher Efficacy Scale. The original Sources of Teacher Efficacy Scale included 61 items that were stated both positively and negatively. In his study, Morris used factor analysis to determine the factor loadings and commonalities of each item, which resulted in the use of only 20 items in the instrument. The 20 items consisted of four mastery experience items, four vicarious experience items, four verbal persuasion items and eight physiological and affective state items. From the results, he showed that mastery experiences and verbal persuasion were most strongly correlated with self-efficacy, with vicarious experiences showing no correlation. Mastery experiences were not found to be predictors of self-efficacy, which presented a validity problem with the scale. Reliability measures for the scale were reportedly low. In his report of findings from the study, Morris stated that the results were encouraging, but due to validity and reliability issues, he also offered suggestions to better improve the Sources of Teacher Efficacy Scale.

Morris reported that the subscale for mastery experiences was not well developed and should include more positive statements. He also noted that mastery experiences were influenced by verbal persuasion through reflection, so this may explain the relationship between the two subscales. Items on the instrument needed to better distinguish between the two subscales (Morris, 2010).

In 2000, Kieffer and Henson, developed the Sources of Self-Efficacy Inventory (SOSI). The design of the instrument was based on Bandura's (1997) four sources of self-efficacy. The instrument used a 35 item, seven point Likert-type scale where responses were (1) definitely not true for me and (7) definitely true for me. Nine items were based on mastery experiences as well as nine items for vicarious experiences. Ten items were based on verbal persuasion and seven items were based on emotional arousal. Using confirmatory factor analysis, the researchers reported that more work needed to be done to the instrument to clarify the subscales of the instrument.

The purpose of a research study in Iran conducted by Mohamedi, Asadzadeh, Ahadi and Jomehri (2011) was to test the validity of the SOSI. For the study, the researchers translated the SOSI into Persian and it was completed by 267 high school teachers. Sixteen of the items on the SOSI were found to have poor internal consistency, so they were removed from the instrument. Then the four subscales of the SOSI which measure the four sources of teacher efficacy were analyzed and they reported that the four factor model of the SOSI was a good fit for the data.

Maw and Swe (2011) conducted a study of 500 preservice teachers in Myanmar to investigate the relationship between teacher efficacy and Bandura's (1997) four sources of teacher efficacy. Participants were given the TSES and the SOSI and the data

from the surveys were analyzed using t-tests and regression analyses. Before completing the study, each instrument was translated into a Myanmar version and after completing the pilot study, the researchers stated that the new version of the SOSI scale was reliable. The researchers found that teacher efficacy was predicted by each of the four sources of efficacy, but most significantly influenced by mastery experiences and vicarious experiences.

In a 2012 study completed by Mohamadi and Asadzadeh (2012), authors focused on the relationship between sources of self-efficacy, teacher efficacy and student achievement. The researchers cited a lack of research based on the sources of self-efficacy and its related variables as the reason for their study. Participants included 284 high school teachers in Iran. The teachers were given a Persian translation of the SOSI with 19 items, the TSES to measure teacher efficacy and student achievement was measured based on student's semester grades from the teacher. The Persian translation of the SOSI was tested in a pilot study and the researchers reported internal consistency and stated that it was a good fit for their data. They found that mastery experiences influenced teacher efficacy the most, with verbal persuasion being the second most influential, followed by vicarious experiences and physiological states being the least influential. They also found that sources of self-efficacy influenced student achievement, as did teacher efficacy. Their findings further substantiated the need to better understand the sources of teacher efficacy in order to enhance teacher efficacy.

The SOSI has been the used by researchers as a model from which to develop new instruments designed around a particular study (Chin et al., 2013; Gloudemans, Schalk, Reynaert & Braeken, 2013; Ulkumen, 2013; Zaier, 2011). Chin et al. (2013)

adapted the questions from the SOSI in their efforts to create an instrument that would measure the sources of teacher efficacy as it relates to applying knowledge from Educational Psychology in teaching. Gloudemans, Schalk, Reynaert and Braeken (2013) used the SOSI as the basis for their research study. The researchers adapted the items on the SOSI in order to determine the sources of self-efficacy for the field of nursing, which was the focus of the study. Of the 35 items on the SOSI, Ulkumen (2013) used the nine items that measure mastery experience. Those nine items were translated to Turkish since Turkey was the location of the study and the Mastery Experience scale consisting of eight items was developed. Zaier (2011) created an instrument to measure sources of multicultural self-efficacy and the SOSI was one instrument the researcher drew upon as inspiration for scale development.

The Teacher Ratings Questionnaire (TRQ) was developed by Weaver Shearn (2007) and used to determine the sources of teacher efficacy for first year teachers. The TRQ consists of 16-items on the same nine-point scale as the TSES. 252 first year teachers responded to the survey and their results showed that mastery experiences were most strongly correlated with teacher efficacy, followed by affective states, vicarious experience and last verbal persuasion. While mastery experiences are perceived to be the most influential source of teacher efficacy, the results from this study contradict other studies, which state that verbal persuasions are a more influential source of efficacy than vicarious experiences or affective states.

Table 2.5

Studies Related to Sources of Teacher Efficacy

STUDY	PURPOSE	PARTICIPANTS	DESIGN	OUTCOMES
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Can (2015)	To determine the sources of TE beliefs in 5 preservice science teachers	4 preservice science teachers	5 separate interviews with each participant	-ME was talked about in the interviews in the form of student and instructor feedback, non-verbal communication, and comparison to others -VE, VP and PAS were influential within the ME
Carelton, Fitch & Krockover (2008)	To examine changes in TE over a year	30 science teachers, varying levels of experience	Completed the STEBI at beginning and end of course and 2 other instruments about attitudes and beliefs in teaching science.	-At beginning of program, teachers drew on all 4 sources of efficacy. As year went on, drew less on vicarious and persuasion, but mastery experiences were stronger. -High efficacy in summer, lowered between summer and fall (doubting their abilities) but raised again during fall and spring -Implications/Relevance – TE can change over the course of a school year; mastery experiences don't seem to fade over the year
Cheung (2008)	To determine the difference in the teacher efficacy of Hong Kong and Shanghai teachers and to determine the sources of those differences	725 Hong Kong teachers 575 Shanghai primary teachers	Compared teacher efficacy results between two countries (TSES scale – adapted for language) Took a closer look to determine why the two were different through follow up questionnaires on sources of teacher efficacy.	-Shanghai had significantly higher efficacy than Hong Kong -Shanghai attributed their higher efficacy to respect from students and parents, training from universities, daily experiences
Chin, Roslan, Kadir & Mahyudin (2013)	To relate sources of self-efficacy with Educational Psychology	160 novice teachers in Malaysia 102 secondary schools	Teachers were given the TSES and the STEI (an adaptation from the SOSI), 4 sources were independent variables, dependent was TE and moderating variables were gender, ethnic group and content knowledge	-Most had moderate levels of teacher efficacy, instructional strategies highest, then classroom management, then student engagement -No significant differences based on gender or ethnic group -Significant differences with content knowledge -Sources from highest to lowest mean scores were social persuasion, vicarious experience, PAS and then ME was last -Correlation of four sources with TE; ME was highest, then social persuasion, then vicarious – all significant; PAS negative significant relationship -for prediction of efficacy – ME was highest

Gabriele & Joram (2007)	Determine the sources of teacher efficacy through verbal reflection from teachers undergoing change to reform based math teaching	10 first and second grade teachers with more than 10 years teaching experience	Volunteered to join program to change their math teaching; recommended by developers as those who are good at implementing change in their classroom; from different schools, urban/rural and low/mid SES Instructed to take ownership, did talk alouds to determine the cognitive processes-done while teachers engaged in the task and retrospectively. Researcher also did observations. Adapted items from the SOSI to fit nursing context	-Veterans recalled higher number of successful events than newcomers, based on the coding from think alouds. -Veterans recalled more about student thinking and were specific, largest difference in thought processes; newcomers recalled more about lesson goal and outcome -Gives good info into the formation of TE, could be very useful for professional development
Gloude mans, Schalk, Reynaert & Braeken (2013)	To determine the sources of self efficacy in the nursing occupation			
Hand & Stuart (2012)	To determine sources of teaching efficacy in PE teachers	15 early career PE teachers	Completed the TSES and then one hour interview	-mastery experiences in the form of learning as they went were strongest -verbal persuasion, specific feedback and negative verbal feedback were 2 nd strongest influences -watching other teachers was third most influential
Hora & Ferrare (2012)	Examine the antecedents of self-efficacy and how those impact teacher efficacy			-Instructor self-efficacy beliefs were related to student evals, peer observations, student performance and trajectory, department organization and self-reflection -Self-reflection is very important in the formation of efficacy beliefs. This includes good performance feedback.
Kahyao glu (2014)	To understand the sources of self-efficacy beliefs	Interviews with three experienced high school science teachers	Interviews	-Mastery experiences – interest and success of students was most influential -VP was 2 nd -VE and PAS not influential

Kieffer & Henson (2000)	To validate the SOSI, new instrument of teacher efficacy			
Maw & Swe (2011)	To determine the sources of teacher efficacy	500 student teachers	-Participants given the TSES and the SOSI -t-tests, regression analysis	-Gender, grade level and institution were variables -Gender was not significantly different, other two variables were -TE significantly correlated with sources of TE -mastery experiences and vicarious experiences are most significant predictors -all variables put together explained 28% of variance in TE
Milner (2002)	To determine the sources of self-efficacy of white teacher in suburban high school and to determine what threatened her efficacy in unsupportive environment; focuses on retention	1 European American teacher in suburban high school; chosen b/c she is self-reflective; articulate and willing	Qualitative case study Observations, interviews	-Showed persistence in a crisis situation, took the negative feedback and learned from it -Takes positive feedback and said that it makes her more confident, from both students and parents -Feedback from colleagues comes from her sense during their conversations that they respect her; some of this was non-verbal; this was critical for her in teacher retention -Mastery experiences were not her most influential, non verbal persuasion was
Milner & Woolfolk Hoy (2003)	To determine sources of efficacy that supported her and encouraged her to stay, even though she was in unsupportive environment. To determine how stereotype threat affected her.	1 African American teacher in suburban high school	Qualitative case study Observations and interviews, both formal and informal	-Isolation from peers has threatened her efficacy and caused her to question herself – physiological and emotional arousal, but these were not overwhelming. -Mastery experiences – helped her, even though she never mastered them bc they were not masterable; had to rely on past teaching experiences and past personal mastery experiences -Context matters b/c in a different context, she would have different views.
Mohammedi & Asadzadeh (2012)	Relate teacher efficacy to sources of efficacy based on	284 high school teachers in Iran with all levels of experience	Completed the SOSI (sources of self efficacy) and TSES Complex methods	-Did a pilot study for consistency, construct validity and reliability for both instruments and that is why they used the TSES, instead of something else -Sources of efficacy beliefs

	Bandura's theory and relate both to student achievement		– factor analysis, structural equation modeling that I do not understand	impact student achievement. TE mediates the effects of sources of efficacy on achievement. -Mastery experiences impact TE; verbal persuasion impacts TE more than vicarious experiences; vicarious experiences were 3 rd ; physiological arousal was negatively correlated with TE – discussion says it was not significant -Implications/Relevance – study calls for the need to learn more about the sources of teacher efficacy.
Moham edi, Asadza deh, Ahadi, & Jomehri (2011)	To test validity of the SOSI in Iran, to test validity of TSES in Iran, to examine sources of TE on student achievement	267 high school teachers in Iran	-SOSI given -TSES given -structural equation modeling to determine impact on achievement	-measured internal consistency of SOSI items and subscales, removed 16 items that had poor consistency, four factor model was found to have good fit, one and two factor model were not -TSES three factor model was a good fit, one factor was not, had internal consistency -achievement is influenced by teacher efficacy and indirectly influenced by sources of teacher efficacy
Morris & Usher (2011)	Examine sources of teacher efficacy based on Bandura's theory	12 award winning professors	Structured interviews	-Most influential was mastery experiences and verbal persuasions (from student evaluations) -Negative events were framed by the professors in a way to overcome the event so it did not have an impact on TE
Oh (2011)	Examine pre-service teachers' efficacy and its sources	43 preservice teachers	Practicum for 5 weeks, given the TSES and the Teaching Efficacy Sources Inventory (TESI), at beginning and end of practicum (pre and post test). TESI measures personality characteristics, capabilities, motivation, enactive mastery with verbal persuasion, vicarious experiences, university training	-TE increased during the practicum, although the results, but no t-test was conducted b/c sample wasn't same -Regression showed that sources of TE did not predict TE for the pretest. -Personality, capabilities, motivation, enactive mastery with verbal persuasion and physiological states were predictors for TE in classroom management in the post test. Capabilities were significant in the post test for instructional strategies. -Characteristics, motivation and capabilities are potential sources of efficacy -Implications/Relevance – sources

			and physiological states	of teacher self efficacy are predictors for TE of classroom management
Palmer (2010)		12 elementary ed teachers in Australia	Surveys (STEBI), interviews, open-ended questionnaire	
Poulou (2007)	Examine sources of teacher efficacy and how they impact efficacy beliefs	198 4 th year education students in Greece	-32 interviews on sources of efficacy related questions -Participants given the TESI and the TSES	-TESI developed, but designed for preservice teachers -combined social persuasion and mastery experiences
Ross & Bruce (2007)	To determine if professional development based on Bandura's theory could increase teacher efficacy	106 6 th grade teachers in one district	Control and treatment group randomly assigned, treatment rcvd PD, at beginning, implemented in classroom and shared with peers, control at end. Also tested groups with other measures to determine if groups were equal.	-Groups were shown to have no significant differences at beginning of study -PD increased TE in classroom management; study suggests that instructional strategies and engagement would follow management -Findings support the change model through mastery experience and vicarious experience -Implications/Relevance – good model about teacher change through self-assessment; good literature about TE being able to change (original source Ross et al 1997) directly related to 4 sources of efficacy -Supports use of TSES as the new standard and gives reasons why (p. 53) -Sharing experiences with peers – redefined success.
Tschann en-Moran, Hoy & Hoy (1998)	Overview of TE; What it means and how it is measured. Reviewed each measure of TE that had been used in research	Sample of teachers – looked at previous research	Studied correlates of each TE measure.	-RAND & Gibson & Dembo r = .64; Gibson & Dembo & TLC scale r=.47; & Guskey scale r=.57 – all related, but not perfectly, so what else are they measuring? -Propose that TE is cyclical. Model on p228 about sources of teacher efficacy and how they are shaping and being shaped. Authors refer to this as an integrated model. Pose that sources are shaped by how teachers analyze the task of teaching. Pose need to test the model. -Discuss development of efficacy beliefs

Tschann en-Moran & Hoy (2007)	Examine the antecedents of TE of new and experienced teachers based on Bandura's theory. Determine the role that contextual factors play in TE.	255 graduate students at 3 universities who were teachers, all years of experience, all grades, varying ages and races	Completed TSES scale and items about perception of support (verbal persuasion) and satisfaction (mastery experiences), both Likert scale, demographics and context	<p>-Career teachers had significantly higher TE than new teachers overall and in instructional strategies and classroom management. Also higher with resource support, admin support and performance satisfaction.</p> <p>-No demographic variables were related to TE for either new or career except school level for career (looked at gender, race, teaching experience, age, teaching setting and school level)</p> <p>-Contextual variables (1. Resources 2 admin support 3 peer support 4parental support 5 community support 6 performance satisfaction) – 1,4,5,6 for career teachers; 1,6 for new teachers were significantly correlated with TE</p> <p>-6 deals with mastery experience and for career teachers mastery experience was related to all of the other variables</p> <p>-Regression analysis – New teachers – context (resources), verbal persuasion (peers and community) and mastery experiences explained variance in TE. For career teachers, context (school level) and mastery experiences explained variance in TE.</p> <p>-Mastery experiences – 49% new and 19% career for explained variance</p> <p>-Implications/Relevance – context, verbal persuasion really important for new teachers. Mastery experiences important for both. Findings point to the need to learn more about antecedent to sources of TE.</p>
Tschann en-Moran & McMaster (2009)	To determine which source of self-efficacy was most influential	93 teachers in 9 primary schools	<p>-completed surveys (TSES and TSERI – both measured teacher efficacy) before and after PD program</p> <p>-implemented learning from</p>	<p>-mastery experiences had highest gains, then VP, then a combo of ME and VP, then VE</p>

			professional development program	
Ulkumen (2013)	To determine predictors of self efficacy belief (university type, major, years of experience, mastery experience support from administration and colleagues)	335 English as foreign language instructors at public and private universities in Turkey	Participants given the TSES, mastery experience scale, colleague support scale and administration support scale (pilot study completed for instrument since instruments were designed for the study)	-Used the mastery experience section of the SOSI to develop a "mastery experience" scale -Validated the ME scale – cronbach's alpha .86 -ME was strongly correlated with TE in classroom management, instructional strategies and student engagement -ME was largest predictor for classroom management, followed by teaching experience (other variables were not)
Usher & Pajares (2009)	Sources of self-efficacy in math	For students		-Researchers went through the process of developing a sources of efficacy scale in mathematics and tested validity, etc.
Usher (2009)				
Yüksel (2014)		40 preservice teachers in English language, 3 rd year students in Turkey	TSES given 3 times, before being placed in a school, during student teaching and after student teaching and reflective papers for qualitative data	

Summary

Research on the construct of teacher efficacy has been inconsistent. Some of these inconsistencies are due to shortcomings of the instruments used to measure teacher efficacy, while other inconsistencies were based on participant differences in the studies, such as teacher experience as well as differences in the variables related to teacher efficacy such as teacher gender. The sources of teacher efficacy, which are primarily based on mastery experiences according to Bandura (1997), may be equally based on mastery experiences and verbal persuasions, according to the research. Specific details

about the sources of teacher efficacy also remain unclear. The types of mastery experiences of teachers and the nature of verbal persuasions or the source of the verbal persuasion such as students or administrators are unknown and need to be further researched. The literature reviewed provided a glimpse into the construct of teacher efficacy and the need for greater understanding of teacher efficacy, how it is formed, and how it is impacted by other variables such as teacher gender and experience.

CHAPTER III

METHODOLOGY

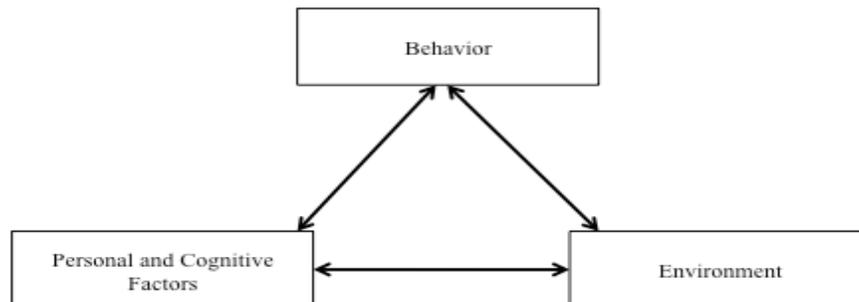
The purpose of this study was to determine the relationship between teacher efficacy, demographic variables, contextual variables and the four sources of teacher efficacy which were (1) mastery experiences, (2) vicarious experiences, (3) verbal persuasions, and (4) psychological and affective states, as described in Bandura's (1997) social cognitive theory. Quantitative data was collected to examine the relationship between each variable in the study and to analyze the ways in which each variable impacted teacher efficacy. The following questions guided the research study:

1. What is the teacher efficacy reported by the participants in the study as measured by the Teachers' Sense of Efficacy Scale?
2. What is the difference, if any, in teacher efficacy among demographic and contextual factors reported by the participants in the study?
3. To what extent is teacher efficacy derived from the four sources of teacher efficacy (1) mastery experiences, (2) verbal persuasions, (3) vicarious experiences, and (4) physiological and affective states as measured by the Teacher Ratings Questionnaire?
4. What is the difference, if any, in the sources of teacher efficacy among demographic and contextual factors reported by the participants in the study?
5. What are the relationships between teacher efficacy, mastery experiences, verbal persuasions, vicarious experiences, physiological and affective states, demographic and contextual factors?

Theoretical Framework

The framework for this study was built upon Bandura's (1997) social cognitive theory, which described the four sources of teacher efficacy. In addition, Bandura (1986) stated there was a triadic causal relationship between a people, their environment and behavior and those three factors work together to influence one's efficacy beliefs. This relationship can be seen in Figure 1.

Figure 1 Model of Triadic Reciprocal Determinism

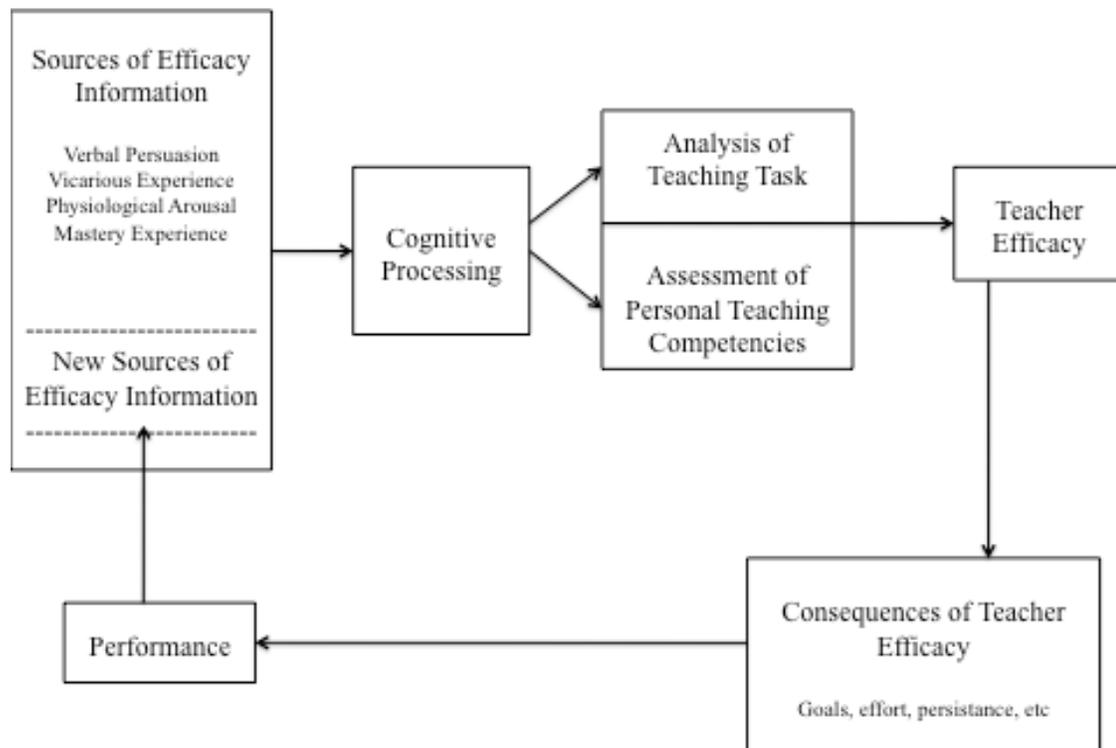


Bandura stated that those factors work together, but the relationship between the three does not have to be equal. If personal factors were lacking, then one of the other factors such as environment may be strongly influenced by one's behavior (Bandura, 1986). For this reason, it was imperative that not only the four sources of teacher efficacy be measured, but that environmental and personal factors should be measured as well to determine their influence on a teacher's beliefs. The need to look at other variables was

substantiated by Tschannen-Moran, Hoy and Hoy (1998), who proposed a more in-depth model of the formation of self-efficacy beliefs. Their proposed model can be seen in

Figure 2.

Figure 2 Formation of Efficacy Beliefs Model



The model shown in Figure 2 provided a schematic representation of how the four sources of teacher efficacy contributed to the formation of efficacy beliefs. The formation of efficacy beliefs depends upon one's cognitive processes and how a person interprets information. The cognitive process of an individual is influenced by factors within their control as well as factors outside their control, or those found within the context of teaching. Because efficacy beliefs are not formed in isolation, rather within the context of teaching and personal beliefs, there was a need to look for additional

variables that may influence teacher efficacy. The variables measured in this study were based on theory and previous research.

Design of Study

The research design of this study was based on the research designs of previous studies related to sources of teacher efficacy. (Maw & Swe, 2011; Morris, 2010; Oh, 2011; Shearn, 2007; Tschannen-Moran & Woolfolk Hoy, 2007; Yüksel, 2014; Zaier, 2011). To answer the research questions, a statistical analysis was completed on the quantitative data collected from a convenience sample of in-service teachers at three secondary schools within the same school district in the southeastern United States. The sample site was chosen based on proximity and accessibility to the researcher. The participants were asked to complete a three-part questionnaire consisting of demographic questions, the TSES and the TRQ. The quantitative data was collected through surveys administered to the participants via email and their participation was voluntary. The formatting and distribution of the surveys followed the guidelines set forth by Dillman, Smyth, and Christian (2009). The number of teachers who returned their survey determined the sample size. The answers from the survey determined teacher efficacy, sources of teacher efficacy, contextual and demographic factors among the sample participants.

Teacher efficacy was the dependent variable in the research study. The independent variables were the four sources of teacher efficacy, mastery experiences, vicarious experiences, verbal persuasions, physiological and affective states as well as the demographic and contextual factors reported from the survey. The data were examined using multiple forms of analysis. Descriptive statistics were reported from the sample

and independent t-tests as well as analysis of variance were used to look for significant differences in groups according to their demographics. Factor analysis of each scale used in the study was completed to determine the number of factors measured by each scale. Analysis of variance was used to determine differences among sources of teacher efficacy as well. Correlation and regression analysis was used to determine relationships among the variables and multiple regression analysis were used to determine significance, if any, that the independent variables have on the dependent variable. Further details of data analysis are described in this chapter and are also listed in the data shell.

Table 3.1
Data Shell

Research Question	Literature Sources	Source, Data,	How data are analyzed	Rationale
1. What is the teacher efficacy reported by the participants in the study as measured by the Teachers' Sense of Efficacy Scale?	Carelton, Fitch & Krockover, 2008 Fives, 2003 Giallo & Little, 2003 Henson, 2002 Klassen, et al, 2011 Mohamedi, et al, 2011 Skaalvik & Skaalvik, 2010 Swars, 2005 Tschannen-Moran & Hoy, 2001	Method: <i>TSES score</i> Data: <i>interval</i>	<i>Descriptive and inferential statistics:</i> <i>Factor analysis</i> <i>Correlation</i> <i>Descriptives</i>	To determine teacher efficacy scores
2. What is the difference, if any, in teacher efficacy among demographic and contextual factors reported by the participants in the study?	Alijinan, 2012 Bloom & Peteres, 2012 Coladarci, 1992 Giallo & Little, 2003 Henson, 2002 Hoy, 2000 Hoy & Spero, 2005 Lee, Bryk & Smith, 1993 Putnam, 2012 Swan, Wolf & Cano,	Method: <i>TSES scores, self-reported demographics, SES data</i> Data: ordinal, nominal	<i>Descriptive and inferential statistics:</i> <i>Independent t-test</i> <i>Analysis of Variance</i>	To determine the difference, if any, in teacher efficacy among gender, experience, race and education level

Research Question	Literature Sources	Source, Data,	How data are analyzed	Rationale
	2011 Tajeddin & Khodaverdi, 2011 Wolters & Daugherty, 2007 Olsen, 2008			
3. To what extent is teacher efficacy derived from the four sources of teacher efficacy (1) mastery experiences, (2) verbal persuasions, (3) vicarious experiences, and (4) physiological and affective states as measured by the Teacher Ratings Questionnaire?	Can, 2015 Cheung, 2008 Chin, et al, 2013 Hand & Stuart, 2012 Hora & Ferrare, 2012 Kahyaolglu, 2014 Kieffer & Henson, 2000 Maw & Swe, 2011 Milner, 2002 Mohamedi & Asadzadeh, 2012 Mohamedi, et al, 2011 Morris & Usher, 2011 Oh, 2011 Shearn, 2007 Palmer, 2010 Poulou, 2007 Ross & Bruce, 2007 Tschannen-Moran & Woolfolk Hoy, 2007 Tschannen-Moran & McMasters, 2009 Ulkumen, 2013 Usher & Pajares, 2009 Yüksel, 2014	Method: <i>SOSI score</i> Data: <i>interval, ordinal</i>	<i>Descriptive and inferential statistics:</i> <i>Factor analysis</i> <i>Correlation</i> <i>Descriptives</i>	To determine the source of teacher efficacy.
4. What is the difference, if any, in the sources of teacher efficacy among demographic and contextual factors reported by the participants in the study?	Carelton, Fitch & Krockover, 2008 Chin, et al, 2013 Maw & Swe, 2011 Milner & Hoy, 2003 Wheatley, 2005 Tschannen-Moran & Woolfolk Hoy, 2007 Ulkumen, 2013	Method: <i>SOSI score, demographic data</i> Data: <i>interval, ordinal, nominal</i>	<i>Descriptive and inferential statistics:</i> <i>Multiple analysis of variance</i>	To determine the difference, if any in teacher efficacy sources among gender, experience, race and education level
5. What are the relationships between teacher	Chin, et al, 2013 Maw & Swe, 2011 Mohamedi & Asadzadeh,	Method: <i>TSES score, SOSI score,</i>	<i>Pearson correlation</i>	To determine the relationship between teacher

Research Question	Literature Sources	Source, Data,	How data are analyzed	Rationale
efficacy, mastery experiences, verbal persuasions, vicarious experiences, physiological and affective states, demographic and contextual factors?	2012	<i>demographic data, SES data</i>	<i>Multiple regression</i>	efficacy, the sources of teacher efficacy, gender experience, race and education level. To determine if teacher efficacy is predicted by any of the above variables.
	Morris, 2010			
	Shearn, 2007	Data: <i>interval, ordinal</i>	<i>Stepwise regression</i>	
	Tschannen-Moran & Woolfolk Hoy, 2007			
Ulkumen, 2013		<i>Hierarchical regression</i>		

Population and Sampling

Participants in the study were certified teachers in three secondary schools in a school district in the Southeastern United States. Each school included students in grades nine through twelve. The demographics for the school system of the students and personnel within each school was obtained online through The Governor’s Office for Student Achievement (2015) and based on the most currently available information posted on the public website. The demographic information for the state, school system and each school in the study was based on the 2013-2014 school year and is displayed in

Table 3.2.

Table 3.2

State, System and School Teacher Demographics

	State	System	School A	School B	School C
Average Years of Experience	13	15	15	16	13
<1	6,196	36	2	2	7
1-10	40,904	286	29	22	21
11-20	39,298	256	30	26	17
21-30	19,182	173	13	22	6
>30	4,375	46	6	3	5

	State	System	School A	School B	School C
Male	21,805	169	30	33	28
Female	88,147	628	50	42	28
Bachelor's	34,743	218	15	21	17
Master's	49,531	392	43	31	20
Ed. Specialist	22,718	178	20	20	9
Doctoral	2,522	8	1	3	0
Other	436	1	1	0	0
White	80,299	673	67	67	49
Black	25,438	102	10	3	3
Hispanic	2,090	6	1	2	1
Asian	1,025	4	1	0	1
Native American	212	1	0	1	0
Multiracial	892	11	1	2	1

Instrumentation

A combination of instruments was used for the study. Those instruments were each chosen based on their close alignment with Bandura's (1997) four sources of teacher efficacy and their use in prior research related to the sources of teacher efficacy. Those instruments were combined and given as one survey to the participants in the study. Permission to use each instrument was obtained by scale developers. An item analysis for the instrument can be found in Table 3.3

Table 3.3

Quantitative Item Analysis

Item	Item Number	Research Question
Demographics	1-6	2, 4, 5
Teacher Efficacy	7-18	1, 2, 5
Mastery Experiences	19, 29	3, 4, 5
Vicarious Experiences	25 - 28	3, 4, 5
Verbal Persuasion	22 - 24	3, 4, 5
Physiological and Affective	31	3, 4, 5

Item	Item Number	Research Question
States		
Contextual Factors	20, 21, 32, 33	2, 4, 5

Prior to administration of the survey, the researcher pre-tested the survey. For the pre-test the survey was given to three teachers that were not participants in the study. The purpose of this was to look for typographical errors in the survey, to ensure that the survey questions made sense and were understandable, and to ensure that the electronic survey worked properly. For the pre-test, the survey was administered through Qualtrics, an online survey software company.

During the pre-testing process, one item from the survey was removed based on feedback from all three teachers. One item on the Teacher Ratings Questionnaire (TRQ) asked teachers to rate the feedback they received from their mentor. This item was removed because the pre-test panel did not feel that this was an applicable question for in-service teachers. Pre-test panel members were able to answer the survey on a nine-point Likert scale with labeled descriptors above every other point on the Likert scale. Panel members were unsure if they could answer in between descriptors. For this reason additional directions were added for the TSES and the TRQ portion of the survey informing participants that they can answer anywhere along the nine-point scale, including between labeled descriptors.

Demographics

Demographic factors could possibly influence a teacher's sense of self-efficacy according to previous research (Bakar, Mohamed & Zakaria, 2013; Tschannen-Moran & Woolfolk Hoy, 2007; Usher & Pajares, 2008b). A teacher's gender (Chin et al., 2013;

Klassen & Chiu, 2010; Tschannen-Moran and Woolfolk Hoy, 2007), race (Chin et al., 2013; Tschannen-Moran and Woolfolk Hoy, 2007), level of education (Fives, 2003; Chin et al., 2013) and years of experience (Chin et al., 2013; Giallo & Little, 2003; Klassen & Chiu, 2010, Tschannen-Moran & Woolfolk Hoy, 2001a; Tschannen-Moran & Woolfolk Hoy, 2007; Woolfolk Hoy, 2000) could impact the formation of efficacy beliefs. For this reason, demographic information was collected through the survey. Participants were asked to report the number of years experience they had as a teacher. Participants were asked additional questions to obtain information about their gender, education level and racial identification as outlined in Appendix D. As with demographics, contextual factors also needed to be measured to control for their influence on teacher efficacy beliefs.

Contextual Factors

Efficacy beliefs may be influenced by contextual factors. For that reason the research instrument included items to measure contextual factors. The contextual factors included in the research instrument linked to teacher efficacy school climate (Giallo & Little, 2003; Tschannen-Moran & Woolfolk Hoy, 2007), school leadership (Calik et al., 2012; Chin et al., 2013; Giallo & Little, 2003; Tschannen-Moran & Woolfolk Hoy, 2001a; Tschannen-Moran & Woolfolk Hoy, 2007; Woolfolk Hoy, 2000), teacher satisfaction (Goddard, Hoy & Woolfolk Hoy, 2004; Klassen 2010; Klassen & Chiu, 2010), teacher stress (Klassen & Chiu, 2010), professional development (Carleton et al., 2004; Ross & Bruce, 2007) and availability of resources (Tschannen-Moran & Woolfolk Hoy, 2007).

Certain contextual factors deemed by researchers (Chin et al., 2013; Klassen & Chiu, 2010; Tschannen-Moran & Woolfolk Hoy, 2001a; Tschannen-Moran and Woolfolk

Hoy, 2007) to be influential in the formation of efficacy beliefs, were automatically controlled for in the study, due to the sample site and the participants. School level (Chin et al., 2013; Klassen & Chiu, 2010; Tschannen-Moran & Woolfolk Hoy, 2001a; Tschannen-Moran and Woolfolk Hoy, 2007) was not measured because all participants taught at the high school level. School context (Chin et al., 2013; Tschannen-Moran & Woolfolk Hoy, 2001a; Tschannen-Moran and Woolfolk Hoy, 2007) was measured because all schools represented in the sample were considered rural. The structure of the school (Tschannen-Moran & Woolfolk Hoy, 2001a; Tschannen-Moran and Woolfolk Hoy, 2007) was measured because the same overall school structure existed at each school.

Teacher Efficacy

The instrument used to measure teacher efficacy was the Teachers' Sense of Efficacy Scale (TSES), developed by Tschannen-Moran and Woolfolk Hoy (2001b). The TSES had two forms, a short form with 12 items and a long form with 24 items. The reliability of the short form was $\alpha = .90$, with $\alpha = .81$ for the subscale student engagement, $\alpha = .86$ for the subscale instruction and $\alpha = .86$ for the classroom management subscale. The reliability of the long form was $\alpha = .94$, with $\alpha = .87$ for the subscale student engagement, $\alpha = .91$ for the subscale instruction and $\alpha = .90$ for the classroom management subscale. The authors also evaluated the construct validity of the scale by examining the correlation of the long form TSES against previously existing teacher efficacy instruments. There was a positive correlation with both items on the RAND measurement of $r = .18$ and $.53$. There was also a positive correlation with both items on the TES measurement, with $r = 0.64$ for personal teaching efficacy and $r = .16$

for general teaching efficacy. According to the authors, the correlations were similar for the short form. Overall, Tschannen-Moran and Woolfolk Hoy reported that each of the forms were reliable and valid to measure the construct of teacher efficacy. Before completing the survey, which included the short form of the TSES, participants were asked to complete an informed consent form, which stated the purpose of the study and how survey data was used. The informed consent form can be found in Appendix A. The entire survey, including the short form TSES can be found in Appendix B. The TSES short form consisted of 12 questions with a nine-point scale for responses. The nine-point scale had anchors at 1 – nothing, 3 – very little, 5 – some influence, 7 – quite a bit, and 9 – a great deal. Permission to use the TSES was obtained online from Woolfolk Hoy and can be found in Appendix C.

The TSES, developed by Tschannen-Moran & Woolfolk Hoy (2001b) was the instrument used to measure teacher efficacy and this decision was based upon previous literature. Ross & Bruce (2007) stated that the TSES was the standard used measure for teacher efficacy. The TSES has been used in numerous studies (Hand & Stuart, 2012; Morris, 2010; Oh, 2011; Shearn, 2007; Tschannen-Moran & McMaster, 2012) as a measure of teacher efficacy. The TSES has been translated into other languages and used to measure teacher efficacy in countries other than the United States (Maw & Swe, 2011; Mohamedi & Asadzadeh, 2012; Yüksel, 2014). Lastly, the TSES has been validated in subsequent research in the United States as well as in other countries (Klassen, Bong, Usher, Chong, Huan, Wong & Georgiou, 2009; Mohamedi et al., 2010).

Sources of Teacher Efficacy

To measure the sources of teacher efficacy, an adapted version of the Teacher Ratings Questionnaire (TRQ) was used (Weaver Shearn, 2007). The adapted instrument is located in Appendix B. The TRQ was based the same nine-point response scale as the TSES. The nine-point scale had anchors where 1 was none at all, 3 was very little, 5 was some degree, 7 was quite a bit and 9 was a great deal. The 15-item TRQ measured four subscales of teacher efficacy with four items measuring mastery experiences, three items measuring vicarious experiences, two items measuring verbal persuasion and two items measuring physiological and affective states. One item measured professional development, one item measured availability of resources and two items measured teacher retention. The author reported a reliability coefficient of $\alpha = .824$ for the 12 items intended to measure the four sources of teacher efficacy and a reliability coefficient $\alpha = .854$ for the entire 16 item instrument. Permission to use this instrument was obtained from the author and found in Appendix C.

Item 19, which assessed satisfaction with professional performance and Item 30, which assessed feedback from administrators on annual teaching evaluation were intended to measure mastery experiences. Item 25, which assessed benefit of collaborating with colleagues, Item 26, which assessed availability to observe other teachers, Item 27, which assessed the benefit of observing other teachers, Item 28, which assessed the helpfulness those who observed you and Item 29, which assessed the helpfulness of informal feedback from administrators, were intended to measure vicarious experiences. Item 22, which assessed interpersonal support from administrators, Item 23, which assessed interpersonal support from colleagues and Item 24, which assessed interpersonal support from district personnel, were intended to

measure verbal persuasion. Item 31, which assessed overall stress, was intended to measure the physiological and affective state as a source of teacher efficacy. Item 20, which assessed the helpfulness of professional development, was intended to measure personal teaching competence and Item 21, which assessed availability of resources, was intended to measure analysis of the teaching task. Item 32 and 33 were both intended to measure teacher retention, which was thought to be a consequence of teacher efficacy.

Data Collection Procedures

The instruments were administered through Qualtrics to each participant in the study via their school email and they were asked to respond on a volunteer basis. A list of school email addresses of certified teachers was obtained from the administrative center for the district. Each certified teacher received a mass email requesting his or her response to the survey. A script of the request to complete the survey can be found in Appendix D. The email included an Internet link to the online survey.

The administration of the survey was done in three waves. The initial wave was a mass email to all participants with a link to the survey with survey instructions included, information about what the survey results were used for, and a request to complete the survey. After five days, the email addresses of participants who completed the survey were removed from the Qualtrics database of survey recipients. The second wave included a reminder email with a link to the survey, instructions, information about what the survey results were being used for and a second request to complete the survey. Five days later, this process was repeated and a third prompt for uncompleted surveys was sent to the remaining participants who had not returned a completed survey. After a total of

two weeks passed from the initial survey request, the period for survey completion ended. Only survey results completed within the two-week period were used in the data analysis.

Ethical Considerations

The participants were not asked for their name on the survey and the survey responses were viewed only by the researcher. Qualtrics database has the ability to store Internet Protocol addresses for survey respondents. This option was removed for the study in order to protect the identity of survey participants. The participants' email addresses, which were recorded through Qualtrics, were not attached to their survey responses. The email addresses were used solely for the purpose of a second and third request for those participants who had not yet completed a survey. The survey status information was kept confidential by the researcher, stored on a password protected file during the survey period and deleted by the researcher at the end of the survey period. Only aggregated data was reported in the study, to further ensure confidentiality of the participants. Permission for the study was obtained through an Institutional Review Board (IRB) at Columbus State University (see Appendix E), the district in which the survey was completed (see Appendix F).

Data Analysis

Several forms of statistical analysis were used within the research study such as factor analysis, Cronbach's alpha, descriptive statistics, Pearson product-moment correlation coefficient, standard multiple regression, hierarchical regression analysis and stepwise regression. Data were entered into Statistical Package for the Social Sciences (SPSS), which was a computer program designed for statistical analysis.

Research Question One

To determine the teacher efficacy scores, data from the TSES instrument given to teachers were analyzed. An exploratory factor analysis of the instrument was completed to determine how many factors were measured on the scale. A correlation matrix was used to determine the relationship between the scale and each factor. Cronbach's alpha was used to determine the internal consistency reliability of the TSES and each of its three subscales, classroom management, instructional strategies and student engagement. A table of descriptive statistics was used to report the number of participants, mean and standard deviation of the survey results. Descriptive statistics were reported for the overall TSES scale, each of the three TSES subscales and each item on the TSES.

Research Question Two

To answer the second research question and determine the difference, if any, of teacher efficacy among contextual factors and demographic variables independent t-tests and analysis of variance (ANOVA) were used. The results were analyzed using $\alpha = .05$. An independent t-test was used to compare the mean teacher efficacy scores of males and females. This was appropriate because an independent t-test was used to determine statistically significant differences by comparing two means (Tabachnick & Fidell, 2013), which in this study are male and female. The mean teacher efficacy scores of teachers based on race, education level and experience were also compared using analysis of variance.

Research Question Three

To determine the teacher efficacy scores, data from the TRQ instrument given to teachers were analyzed. An exploratory factor analysis of 11 of the 15 items on the instrument was completed to determine how many factors were measured on the scale. A correlation matrix was used to determine the relationship between the scale and each factor. Cronbach's alpha was used to determine the internal consistency reliability of the TRQ and each of its four subscales, mastery experiences, vicarious experiences, verbal persuasion and physiological and affective states. A table of descriptive statistics was used to report the number of participants, mean and standard deviation of the survey results. Descriptive statistics were reported for the overall TRQ scale, each of the four TRQ subscales and 11 of the 15 items on the TRQ.

Research Question Four

To answer the fourth research question and determine the difference, if any, of the sources of teacher efficacy among contextual factors and demographic variables multiple analysis of variance (MANOVA) were used. The results were analyzed using $\alpha = .05$. Teacher gender, race, education level and experience level were compared using MANOVA to look for significant differences among groups. The mean scores of the 15 items on the TRQ were compared using MANOVA for each group (Tabachnick & Fidell, 2013).

The teacher gender, subject, education level, grade level and race data were nominal data. These data were classified where each category was assigned an arbitrary

number for data analysis (Lomax & Hahs-Vaughn, 2012). Teacher's experience level were ordinal data, due to the fact that the difference between a first and second year teacher may be much greater than the difference between two teachers in their twenty-ninth and thirtieth year (Lomax & Hahs-Vaughn, 2012). The years of experience was collected as a raw number and a frequency table was used to display intervals of teacher experience levels. The first interval was from zero to three years experience, which represented new teachers (Woolfolk Hoy, 2000; Tschannen-Moran & Woolfolk Hoy, 2007). The second interval was from four to five years experience, which represented inexperienced teachers (Giallo & Little, 2003). The third level of experience was greater than or equal to six years of teaching experience and represented experienced teachers. These intervals were chosen based on previous literature (Bandura, 1997; Chin et al., 2013; Giallo & Little, 2003; Woolfolk Hoy, 2000; Tschannen-Moran & Woolfolk Hoy, 2007). First Bandura's (1997) theory that teacher efficacy did not change once established after the first few years of teaching. Woolfolk Hoy (2000) reported results from novice teachers as those teachers with zero to three years of teaching experience. Giallo & Little (2003) stated that teacher efficacy improved after six years of experience.

Research Question Five

To determine the relationship between the dependent variable teacher efficacy and the independent variables mastery experiences, vicarious experiences, verbal persuasions, physiological and affective state, demographic and contextual factors, regression analysis was used. The Pearson product-moment correlation coefficient was used to report the relationships among each variable in the study (Lomax & Hahs-Vaughn, 2012). Pearson correlation coefficients were reported in a correlation matrix, which showed the

correlation between teacher efficacy, mastery experiences, vicarious experiences, verbal persuasions, physiological and affective states, contextual factors and demographic variables. The significance level was set at $\alpha = .05$.

Multiple regression analysis was used to further examine the impact that each independent variable had on teacher efficacy. Standard multiple regression was used to determine how each independent variable contributed to teacher efficacy. With standard multiple regression analysis, each independent variable was entered into the regression equation simultaneously (Tabachnick & Fidell, 2013). The results were analyzed using $\alpha = .05$.

Evaluation of Research Methods

To answer the research questions, quantitative data were gathered through a survey consisting of the demographic questions, the TSES, which measured teacher efficacy and the TRQ, which measured the sources of teacher efficacy and also included questions pertaining to contextual factors. Dependability of the data was strengthened in many ways. The data collection methods described in the procedures section of this chapter were followed precisely and data were kept well organized throughout the study. All surveys were completed in Qualtrics and administered in the same manner for all participants. A large sample size of surveys were collected, which will also increase the dependability of the data. Data were collected from three different locations described in Table 3.2, which increased the external validity of the data. A study has transferability if it can be useful for others to apply in different situations. The details provided in the Data Collection Procedures section of this chapter could be repeated by others and used

for more understanding of the research. Eisner (1991) calls this process referential adequacy.

The surveys used to answer this research question could be offensive due to language and questions could unfairly discriminate against certain groups. For this reason, the instruments used in the study were previously published instruments in peer-reviewed studies. Using existing instruments was a method used to control for unfair and discriminatory questions, as well as bias. Pre-testing the survey with non-participating educators also helped to establish content validity.

To control for omitted variable bias, multiple instruments were used to collect data on previously studied variables that might influence a teacher's sense of self-efficacy. This included the demographic questionnaire, which measured experience, race, education level and gender of the teacher participants. This also included the TSES, which measured teacher efficacy and the TRQ, which measured each of the four sources of teacher efficacy as well as teacher satisfaction, the teaching task and teaching competence. Those instruments were chosen because of their use in previous studies as a reliable instrument to measure variables that may impact teacher efficacy. Those instruments adhered to the theoretical framework, which also helped to establish content validity within the study.

The study was approved by the Columbus State University IRB and by the district administration in the district where the surveys were distributed. Eisner (1991) called the faculty review process consensual validation, which is an agreement among competent others that the description, interpretation, evaluation and thematic are right. The study was compared to available literature on the topic of self-efficacy, teacher

efficacy and measures, sources of teacher efficacy and measures and variables related to teacher efficacy. Denzin and Lincoln (1998) described this cycling back as epistemological validation, where the reader is convinced that there was consistency with the theoretical perspectives used in the review of the literature.

Face validity

Credibility of the research study was shown through structural corroboration, fairness and precision. Eisner (1991) said structural corroboration exists when the confluence of evidence comes together to form a compelling whole. The study used quantitative data from a combination of two instruments, both rooted in social cognitive theory, and the alignment of each source provides evidence of structural corroboration. Opposing points of view on teacher efficacy and its sources were stated in the review of the literature. Also participants in the data collection process had opposing points of view. Those examples of opposition exhibited the fairness of the study. Data collection and analysis methods were precise and strong evidence was presented. Eisner (1991) referred to precision as rightness of fit, which ensures a tight argument and a coherent case. The rightness of fit allowed judgment to be made as a result of the research.

Limitations

The data collected for this study were collected during the middle of the school year and were only be given to current high school teachers. The survey timing during the middle of the school year could have impacted the results. Surveying only high school teachers could also have impacted the results of the survey. Additionally, this was

a cross-sectional study, not a longitudinal study, which would have offered a chance to see the impact of variables over time.

Summary

The purpose of this study was to learn more about teacher efficacy, the dependent variable, and its relationship with independent variables, which were the four sources of teacher efficacy (1) mastery experiences, (2) vicarious experience, (3) verbal persuasion, and (4) physiological and affective states as well as contextual and demographic factors. An instrument consisting of the TSES, the TRQ, contextual and demographic questions was given to all certified high school teachers in a single district. Results from this survey were analyzed to determine the differences, if any, in teacher efficacy and the differences, if any, of the sources of teacher efficacy based upon teacher's contextual and demographic factors. Further analysis focused on the relationship between every variable in the study, which were presented using a correlation matrix. Standard multiple regression was used to determine the impact that each variable had on teacher efficacy and stepwise regression was used to explain the predictability of each item of the TRQ for the construct of teacher efficacy.

CHAPTER FOUR

RESULTS

This chapter presents the results of the teachers' sense of self-efficacy and its relationship to the four sources of teacher efficacy according to Bandura (1997), demographic variables and contextual factors. The dependent variable, teacher efficacy as measured by the TSES and the independent variables, mastery experiences, vicarious experiences, verbal persuasion, physiological and affective state, teacher experience, teacher gender, teacher education level, teacher race, grade level taught and subject level taught, were analyzed to answer the research questions stated below:

1. What is the teacher efficacy reported by the participants in the study as measured by the Teachers' Sense of Efficacy Scale?
2. What is the difference, if any, in teacher efficacy among demographic and contextual factors reported by the participants in the study?
3. To what extent is teacher efficacy derived from the four sources of teacher efficacy (1) mastery experiences, (2) verbal persuasions, (3) vicarious experiences, and (4) physiological and affective states as measured by the Teacher Ratings Questionnaire?
4. What is the difference, if any, in the sources of teacher efficacy among demographic and contextual factors reported by the participants in the study?
5. What are the relationships between teacher efficacy, mastery experiences, verbal persuasions, vicarious experiences, physiological and affective states, demographic and contextual factors?

Sample

Six questions were included in the instrument to gain information about the participant's demographic background and the context in which they teach. Specifically, these questions were intended to determine participants' number of years of teaching experience, gender, content level, grade level, education level and race. The study included 103 participants, all certified high school teachers with an average of 14.71 (SD = 9.664) years of teaching experience. The demographic characteristics of the sample are shown in Table 4.1.

Table 4.1

Participants' Demographic Variables and Contextual Characteristics

Variable	Category	<i>n</i>	Percentage (%)
Teaching Experience	New	16	15.5
	Inexperienced	6	5.8
	Experienced	81	78.6
Gender	Male	35	34.3
	Female	67	65.7
Teaching Content	English/Language Arts	18	14.5
	Mathematics	29	23.4
	Science	17	13.7
	Social Studies	24	19.4
	Other	36	29.0
Grade Level	9 th	64	22.3
	10 th	76	26.5

Variable	Category	<i>n</i>	Percentage (%)
	11 th	73	25.4
	12 th	74	25.8
Education Level	Less than Bachelor Degree	0	0
	Bachelor's degree	19	18.4
	Master degree	50	48.5
	Education Specialist	32	31.1
	Doctoral Degree	2	1.9
Race	White	91	88.3
	Black or African American	9	8.7
	American Indian or Alaska Native	0	0
	Asian	0	0
	Native Hawaiian or Other Pacific	0	0
	Islander		
	Other	3	2.9

Research Question One

To answer the first research question, data from the TSES instrument were examined using exploratory factor analysis. Factor analysis is used when a researcher needs to better understand the structure of a data set to determine the number of core factors that are influencing the data responses (Tabachnick & Fidell, 2013). There are four ways to determine the number of factors within a data set. The first is a factor analysis using principal components extraction to determine eigenvalues, which show

variance. Each variable contributes a variance of one, so components with eigenvalues greater than one are important in explaining variance of the data. Second, a scree test is a graphical representation of factors and their eigenvalues, where factors are plotted on the x-axis and eigenvalues plotted on the y-axis. A line is drawn connecting each point. To determine the number of factors to retain, the researcher should look for a change in the slope of the line that connects the data points. A scree test is not always an accurate measure of factors to retain and is best suited for large samples. A third measure is a parallel analysis. An alternative to parallel analysis is the minimum average partial correlation test. Based on previous research (Tschannen-Moran & Hoy, 2001), practical suggestions (Tabachnick & Fidell, 2013) and the capabilities of the data analysis software used in the study factor analysis with principal components extraction and a scree test was used to determine the number of factors that were retained.

In their development of the TSES, Tschannen-Moran & Hoy (2001) described a method of principal axis factoring extraction with varimax rotation of the factors. Three factors described 58% of the variance in teacher efficacy scores. On the short form TSES, which was used in the current study, items 1, 6, 7, 8 loaded on one factor (classroom management), items 5, 9, 10, 12 loaded on the second factor (instructional strategies) and items 2, 3, 4, 11 loaded on the third factor (student engagement).

Factor Analysis

In the current study, the 12 items of the TSES were examined using exploratory factor analysis with an extraction method of principal components analysis was used to determine the number of factors with eigenvalues greater than one and to obtain a scree plot of the data (Tabachnick & Fidell, 2013). Three factors were shown to have

eigenvalues greater than one, explaining a total of 66.387% of the variance. Table 4.2 shows the eigenvalues, percent of variance explained by each component and the cumulative percent of the variance explained by the components.

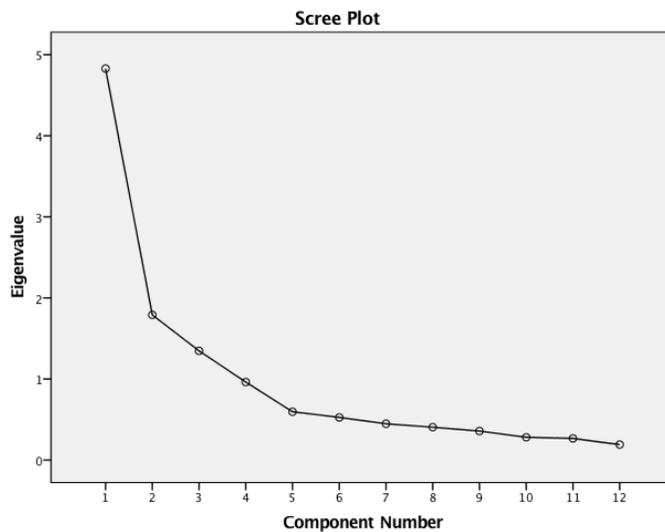
Table 4.2

TSES Eigenvalues from Principal Components Factor Analysis

Component	Total	<u>Initial Eigenvalues</u>	
		% of Variance	Cumulative %
1	4.829	40.240	40.240
2	1.791	14.922	55.162
3	1.347	11.226	66.387

The scree plot for the data is shown in Figure 3, which has a change in slope at factor 5.

Figure 3 Scree Plot for TSES



Based on this factor analysis and previous research, the decision was made to retain three factors for further analysis of the data. Next an extraction method of principal axis factoring with a varimax rotation was used to determine the factor loadings for each item in the instrument. Results with a factor loading of less than .32 were omitted from the matrix, as they were a poor measure of the factor (Tabachnick & Fidell, 2013). Items 7, 12, 13, and 14 loaded onto the first factor and all with a factor loading above .71, which was an excellent measure of the factor. Item seven had a weak loading on the third factor. Items 11, 15, 16, 17, and 18 loaded onto the second factor. Item eleven loaded onto the first and second factor, but had a stronger loading for the second factor. A factor loading of .45 is a fair measure and item 11 loaded .449 on the second factor, so it was determined that item 11 loaded onto the second factor more than the first factor. Item 17 had a low loading on the second factor, but failed to load on any other factor. Items 15, 16, and 18 were very good to excellent factor loadings. Items 8, 9, and 10 loaded onto the third factor and the measures were very good to excellent loadings. Results from the principal axis factoring with a varimax rotation were arranged according to factor and strength of loading as shown in Table 4.3

Table 4.3

TSES Factor Loadings and Communalities

Item	Factor		
	1	2	3
12	How much can you do to get children to follow classroom rules?	.818	
14	How well can you establish a classroom management system with each group of students?	.746	

		Factor	
7	How much can you do to control disruptive behavior in the classroom?	.740	.389
13	How much can you do to calm a student who is disruptive or noisy?	.736	
18	How well can you implement alternative strategies in your classroom?		.812
15	How much can you use a variety of assessment strategies?		.699
16	To what extent can you provide an alternative explanation or example when students are confused?		.635
11	To what extent can you craft good questions for your students?	.409	.449
17	How much can you assist families in helping their children do well in school?		.414
9	How much can you do to get students to believe they can do well in schoolwork?		.716
10	How much can you do to help your students value learning?		.696
8	How much can you do to motivate students who show low interest in schoolwork?		.669

Rotation converged in six iterations

The mean of the overall teacher efficacy score and the means of each subscale of the instrument were used to analyze the relationship between the scale and the subscale. A correlation of the TSES scores and the scores of each subscale was examined. Each value was positively correlated with one another, $p < .001$. This suggests that a single construct was measured, teacher efficacy and that each subscale is interrelated to the construct of teacher efficacy. Results from the correlation analysis can be seen in Table 4.4

Table 4.4

Factor Correlation Matrix of Inter-relationships for TSES Scale

	1	2	3	4
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	1	2	3	4
1. TSES	-	.806**	.775**	.783**
2. Classroom Management		-	.385**	.489**
3. Instructional Strategies			-	.428**
4. Student Engagement				-

Significant at the .001 level

To determine the internal consistency reliability of the data (Salkind, 2010), Cronbach's alpha coefficient was calculated for the mean TSES score and for the mean of each subscale of the TSES. The reliability coefficient for the TSES was .860 and the reliability coefficients for each subscale, which are shown in Table 4.5, were also high. Nolan and Heinzen (2012) stated that a reliability coefficient should be at least .80. Due to the high reliability coefficients, the TSES scale is measuring one construct, teacher efficacy, and the subscales are each measuring a single construct.

Table 4.5

Reliability Coefficients for TSES and TSES subscales

Scale	Number of Items	Reliability Coefficients
TSES	12	.860
Classroom Management Subscale	4	.877
Instructional Strategies Subscale	5	.768
Student Engagement Subscale	3	.782

Descriptive statistics were used to find the mean teacher efficacy score, which was 6.64 (SD .8649). This is a moderately high teacher efficacy score, indicating that the

participants in the study mostly believe that they are able to achieve desired results in their classroom. The mean teacher efficacy score is close to the mean teacher efficacy score of 7.1 reported by Tschannen-Moran and Hoy in their 2001 study. The means for the subscale classroom management was 6.82 (SD 1.172, a mean of 7.00 (SD .9301) for instructional strategies and a mean of 5.76 (SD 1.278) for student engagement. These results were similar to results from prior research. Tschannen-Moran and Hoy (2001) reported means of 6.7 (SD 1.2), 7.3 (SD 1.2), and 7.2 (SD 1.2) for classroom management, instructional strategies and student engagement, respectively.

Table 4.6

Descriptive Statistics for TSES, TSES subscales and TSES items

Item	Description	<i>n</i>	<i>M</i>	<i>SD</i>
	TSES	101	6.64	.8649
	TSES Classroom Management Subscale	102	6.82	1.172
	TSES Instructional Strategies Subscale	103	7.00	.9301
	TSES Student Engagement Subscale	104	5.76	1.278
7	How much can you do to control disruptive behavior in the classroom?	104	6.89	1.454
8	How much can you do to motivate students who show low interest in school work?	104	5.41	1.580
9	How much can you do to get students to believe they can do well in schoolwork?	104	6.12	1.457
10	How much can you do to help your students value learning?	104	5.75	1.556
11	To what extent can you craft good questions for your students?	104	7.38	1.225
12	How much can you do to get children to follow classroom rules?	103	6.85	1.331

Item	Description	<i>n</i>	<i>M</i>	<i>SD</i>
13	How much can you do to calm a student who is disruptive or noisy?	104	6.42	1.479
14	How well can you establish a classroom management system with each group of students?	103	7.03	1.287
15	How much can you use a variety of assessment strategies?	104	7.33	1.288
16	To what extent can you provide an alternative explanation or example when students are confused?	103	7.95	1.088
17	How much can you assist families in helping their children do well in school?	104	5.52	1.507
18	How well can you implement alternative strategies in your classroom?	104	6.85	1.298

Research Question Two

To answer the second research question and determine the difference, if any, of teacher efficacy among contextual factors and demographic variables independent t-tests and analysis of variance (ANOVA) will be used (Tabachnick & Fidell, 2013). The results will be analyzed using $\alpha = .05$. ANOVA is used to compare more than two means (Lomax & Hahs-Vaughn, 2012). Participants responded in three categories for race, four categories for level of education and were divided into three groups for experience level. In order to compare the means for each of the subgroups, ANOVA is an appropriate measure (Tabachnick & Fidell, 2013).

The contextual variables in the instrument included the participants' subject taught and grade level taught. Participants were asked to choose all that applied to them when answering those two questions. Because participants were able to provide more than one response to the same question, this was called a repeated measure. ANOVA could

not be used to compare the means of these data because the data are not independent, which is required for ANOVA (Tabachnick & Fidell, 2013).

Gender

Independent t-tests were conducted to determine if there were statistic differences in the teacher efficacy among males and females (Tabachnick & Fidell, 2013). The male participants (n = 34) in the study had higher teacher efficacy scores (M = 6.63, SD = .9221) than the female (n = 65) participants (M = 6.61, SD = .8232). The results of the independent t-test indicate $t_{(97)} = .151, p = .881$. The findings were evaluated at $\alpha = .05$. Because $p > \alpha$, the null hypothesis that there are no differences between the teacher efficacy scores of males and females can be accepted. Therefore, there are no significant differences in the teacher efficacy scores based on teacher gender.

Race

A one-way analysis of variance was conducted to determine if there were significant differences in teacher efficacy based on teachers' race (Tabachnick & Fidell, 2013). Three groups were examined for mean differences 1) White (M = 6.54, SD = .8407), 2) Black or African American (M = 7.38, SD = .5638), and 3) Other (M = 6.75, SD = .8649). Based on the results in Table 4.7, $p < .05$, therefore the null hypothesis that all groups are equal can be rejected. There is a statistically significant difference in the mean teacher efficacy score between participant's race.

Table 4.7

ANOVA results for TSES Scores of Race

<i>Race</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Source</i>	<i>Sums of Squares</i>	<i>df</i>	<i>Mean Sums of Squares</i>	<i>F</i>	<i>p</i>
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<i>Race</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Source</i>	<i>Sums of Squares</i>	<i>df</i>	<i>Mean Sums of Squares</i>	<i>F</i>	<i>p</i>
White	88	6.54	.8407	Between Groups	5.769	2	2.885	4.167	.018*
Black or African American	9	7.38	.5638	Within Groups	67.154	97	.692		
Other	3	6.75	.8649						

*P < .05

Level of Education

A one-way analysis of variance was conducted to determine if there were significant differences in teacher efficacy based on teachers' education level obtained (Tabachnick & Fidell, 2013). Four groups were examined 1) Bachelor's Degree (M = 6.72, SD = .9782) 2) Master's Degree (M = 6.57, SD = .8558) 3) Education Specialist Degree (M = 6.63, SD = .8287) and 4) Doctoral Degree (M = 6.95, SD = .2946). Based on the results in Table 4.8, $p > .05$, therefore the null hypothesis that all groups are equal can be accepted. There are no statistically significant differences in the mean teacher efficacy scores between participant's education level obtained.

Table 4.8

ANOVA results for TSES Scores of Level of Education

<i>Education Level</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Source</i>	<i>Sums of Squares</i>	<i>df</i>	<i>Mean Sums of Squares</i>	<i>F</i>	<i>p</i>
Bachelor's Degree	19	6.72	.9782	Between Groups	5.48	3	.183	.242	.867
Master's Degree	49	6.57	.8558	Within Groups	72.376	96	.754		
Education Specialist	30	6.63	.8287	Total	72.924	99			
Doctoral Degree	3	6.95	.2946						

Teaching Experience

A one-way analysis of variance was conducted to determine if there were significant differences in teacher efficacy based on teachers' experience level (Tabachnick & Fidell, 2013). Three groups were examined 1) New (M = 6.65, SD = 1.027) 2) Inexperienced (M = 7.13, SD = .8987), and 3) Experienced (M = 6.58, SD = .8171) Based on the results in Table 4.9, $p > .05$, therefore the null hypothesis that all groups are equal can be accepted. There are no statistically significant differences in the mean teacher efficacy scores between participant's teaching experience.

Table 4.9

ANOVA results for TSES Scores of Teaching Experience

<i>Experience</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Source</i>	<i>Sums of Squares</i>	<i>df</i>	<i>Mean Sums of Squares</i>	<i>F</i>	<i>p</i>
New	16	6.65	1.027	Between Groups	1.668	2	.834	1.135	.326
Inexperienced	6	7.13	.8987	Within Groups	71.256	97	.735		
Experienced	79	6.58	.8171	Total	72.924	99			

Research Question Three

The Teacher Ratings Questionnaire (TRO) was designed to measure the four sources of teacher efficacy (Bandura, 1997). Items 19 and 22 through 31 were intended to measure mastery experiences, vicarious experiences, verbal persuasions and

physiological and affective states. The remaining items on the TRQ were intended to measure other variables and were not included in the TRQ analysis. Item 19 was intended to measure the effect of professional development on teacher efficacy and item 20 was intended to measure the effect of availability of resources on teacher efficacy. These items were based on teaching competence and analysis of the teaching task, as proposed by Tschannen-Moran and Hoy in their 2007 study. Items 32 and 33 were related to teacher retention and were removed from the TRQ for the factor analysis. The four items removed from the TRQ analysis were analyzed in different areas of the study.

Factor Analysis

In the current study, 11 items of the TRQ were examined using exploratory factor analysis with an extraction method of principal components analysis. This was used to determine the number of factors with eigenvalues greater than one and to obtain a scree plot of the data (Tabachnick & Fidell, 2013). Four factors were shown to have eigenvalues greater than one, explaining a total of 76.120% of the variance. Table 4.10 shows the eigenvalues, percent of variance explained by each component and the cumulative percent of the variance explained by the components.

Table 4.10

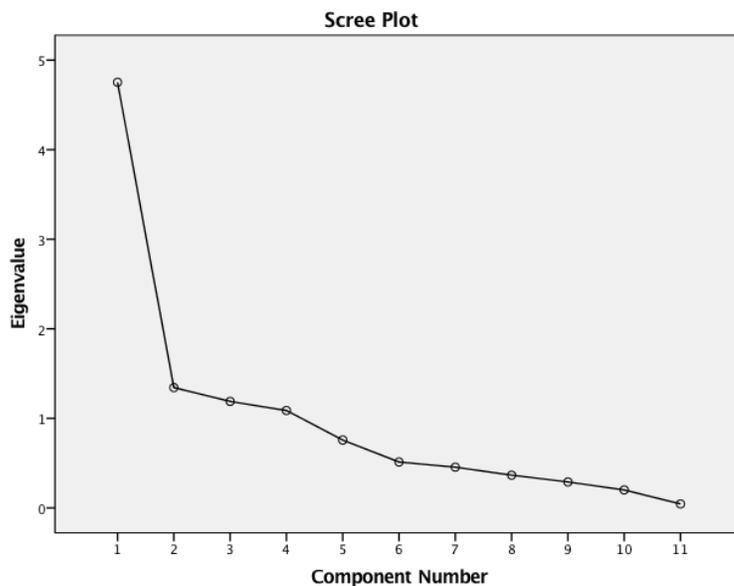
TRQ Eigenvalues from Principal Components Factor Analysis

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	4.753	43.206	43.206
2	1.344	12.216	55.421

Initial Eigenvalues			
3	1.189	10.810	66.231
4	1.088	9.889	76.120

Figure 4 shows the scree plot for the data, which has a change in slope at factor 4.

Figure 4 Scree Plot



Based on this factor analysis and previous research (Weaver Shearn, 2008), the decision was made to retain four factors for further analysis of the data. Next an extraction method of principal axis factoring with a varimax rotation was used to determine the factor loadings for each item in the instrument (Tabachnick & Fidell, 2013). Results with a factor loading of less than .32 were omitted from the matrix, as they are poor measure of the factor (Tabachnick & Fidell, 2013). Items 30, 29, 22, 24 loaded onto the first factor and all are above .71, which is thought to be an excellent measure of the factor. Items 29 poorly loaded onto the second factor and was only

slightly above the .32 criteria for omission. Items 26, 27, 28 loaded onto the second factor and were excellent factor measures due to factor loadings greater than .71. Items 23 and 25 loaded onto the third factor and the measures were excellent loadings. Items 31 and 19 loaded onto the fourth factor and were excellent measures due to factor loadings greater than .71. Both items had poor factor loadings onto the third factor and were only slightly above the .32 criteria for omission. Results from the principal axis factoring with a varimax rotation are arranged according to factor and strength of loading as shown in Table 4.11

Table 4.11
TRQ Factor Loadings and Communalities

Item		Factor			
		1	2	3	4
30	Rate the helpfulness of the informal feedback you receive from campus administrators about your teaching for your annual teacher evaluation.	.869			
29	Rate the helpfulness of the informal feedback you receive from campus administrators about your teaching.	.851	.355		
22	Rate the interpersonal support provided to you by campus administrators.	.816			
24	Rate the interpersonal support provided to you by your district personnel.	.784			
26	Rate the availability of opportunities provided to you to observe other teachers.		.831		
27	Rate the benefit you receive from observing other teachers on your campus.		.808		
28	Rate the helpfulness of feedback you receive from teachers who observe you or coach you.		.743		
23	Rate the interpersonal support provided to you by campus colleagues.			.870	
25	Rate the benefit you receive from collaborating with your campus colleagues?			.773	
31	Rate the overall level of stress you experience as a teacher.			-.363	.743

		Factor	
19	Rate your satisfaction with your professional performance.	.384	.714

Rotation converged in 6 iterations

The mean of the overall sources of teacher efficacy score and the means of each of the four subscales of the instrument were used to analyze the relationship between the scale and the subscales. There was a significant, positive relationship between each factor and the TRQ scores overall, with the exception of the physiological states factor. This suggests that mastery experiences, vicarious experiences and verbal persuasions are interrelated factors and the factor measuring physiological states is a separate, unrelated construct. Results from the correlation analysis can be seen in Table 4.12

Table 4.12

Factor Correlation Matrix of Inter-relationships for TRQ Scale

	1	2	3	4	5
1. TRQ	-	.863**	.813**	.672**	.176
2. Mastery Experiences		-	.539**	.466**	-.007
3. Vicarious Experiences			-	.421**	.038
4. Verbal Persuasions				-	-.042
5. Physiological and Affective States					-

**Significant at the .01 level

To determine the internal consistency reliability of the data (Salkind, 2010), Cronbach's alpha coefficient was calculated for the mean TRQ score and for the mean of each subscale of the TRQ. The reliability coefficient for the TRQ was .837 and the reliability coefficients for three subscales, which are shown in Table 4.13, were also high.

Nolan and Heinzen (2012) stated that a reliability coefficient should be at least .80. Due to the high reliability coefficients, the TRQ scale is measuring one construct, sources of teacher efficacy, and three of the subscales are each measuring a single construct, mastery experiences, vicarious experiences and physiological and affective states.

Table 4.13

Reliability Coefficients for TRQ and TRQ subscales

Scale	Number of Items	Reliability Coefficients
TRQ	12	.837
Mastery Experiences Subscale	4	.901
Vicarious Experiences Subscale	3	.809
Verbal Persuasion Subscale	2	.779
Physiological and Affective States	2	.130

Each of the eleven items of the TRQ were analyzed using descriptive statistics. The highest mean was seen in the physiological states category ($M = 7.26$, $SD = 1.127$) and the lowest mean was seen in vicarious experiences ($M = 5.10$, 1.824). The physiological states category also had the lowest standard deviation, which suggests that category had the least variation among responses. Item 19 (Rate your satisfaction with your professional performance.) and Item 31 (Rate the overall level of stress you experience as a teacher.) had the highest mean teacher efficacy ratings. Item 24 (Rate the interpersonal support provided to you by your district personnel.) had the lowest mean teacher efficacy ratings among the participants.

Table 4.14*Descriptive Statistics for TRQ, TRQ subscales and TRQ items*

Item	Description	n	mean	Std dev	variance
	TRQ Overall	98	5.83	1.189	1.414
	Mastery Experiences Subscale	103	5.20	1.676	2.809
	Vicarious Experiences Subscale	102	5.10	1.824	3.328
	Verbal Persuasion Subscale	103	6.73	1.736	3.014
	Physiological and Affective State Subscale	100	7.26	1.127	1.270
19	Rate your satisfaction with your professional performance.	102	7.11	1.274	1.622
22	Rate the interpersonal support provided to you by campus administrators.	104	5.49	1.885	3.553
23	Rate the interpersonal support provided to you by campus colleagues.	104	6.88	1.656	2.744
24	Rate the interpersonal support provided to you by your district personnel.	104	4.36	1.859	3.455
25	Rate the benefit you receive from collaborating with your campus colleagues?	103	6.55	2.150	4.622
26	Rate the availability of opportunities provided to you to observe other teachers.	103	4.90	2.176	4.736
27	Rate the benefit you receive from observing other teachers on your campus.	104	5.34	2.056	4.225
28	Rate the helpfulness of feedback you receive from teachers who observe you or coach you.	103	4.97	2.194	4.813
29	Rate the helpfulness of the informal feedback you receive from campus administrators about your teaching.	104	5.54	1.910	3.649
30	Rate the helpfulness of the informal feedback you receive from campus administrators about your teaching for your annual teacher evaluation.	103	5.48	1.984	3.938
31	Rate the overall level of stress you experience as a teacher.	102	7.38	1.769	3.130

Research Question Four

To answer the fourth research questions and determine the difference, if any, of the sources of teacher efficacy among demographic variables analysis of variance was

used. The results were analyzed using $\alpha = .05$. Gender, race, education level and experience were analyzed using multiple analysis of variance (MANOVA). This is appropriate because MANOVA is used to determine statically significant differences among multiple dependent variables by comparing two or more means (Tabachnick & Fidell, 2013). For each demographic variable, the dependent variables were the mean score for all 15 items in the Teacher Ratings Questionnaire. Cohen's d was used to determine the magnitude of the differences (Salkind, 2010).

Gender

The mean responses for each of the 15 items on the TRQ were analyzed based on gender using MANOVA, $\alpha = .05$. Item 31 and 33 showed significant differences in responses among males and females. Item 31 is a physiological and affective states item and Item 33 is a teacher retention item, perceived to be an outcome of teacher efficacy. The responses for females for Item 31 were significantly higher than the responses for males. The responses for males for Item 33 were significantly higher than the responses for females. The Cohen's d statistic yields further insight into these differences. For each of the two items with significant differences, the effect size was small, meaning that the differences among the groups, while significant, are slight. Results of the MANOVA based on gender are shown in Table 4.15 (Tabachnick & Fidell, 2013).

Table 4.15

Comparison of Means for Each Item on TRQ Based on Gender

Item	<u>Male</u>		<u>Female</u>		M Difference	t	p	Cohen's d	Effect Size
	M	SD	M	SD					

	<u>Male</u>		<u>Female</u>							
19PAS	6.97	1.59	7.23	1.14	.26	.822	.367	.009		
20	4.82	2.13	5.03	1.77	.21	.273	.603	.003		
21	5.52	1.77	4.87	1.60	.65	3.23	.075	.034		
22 ME	5.85	1.89	5.44	1.90	.41	1.02	.316	.011		
23VP	7.48	1.30	6.73	1.79	.75	4.64	.034	.048		
24ME	5.03	2.10	4.03	1.65	1.00	6.50	.012	.065		
25VP	7.06	2.02	6.37	2.11	.69	2.38	.126	.025		
26VE	5.36	2.18	4.74	2.20	.62	1.74	.191	.018		
27VE	5.79	2.10	5.21	1.95	.58	1.79	.184	.019		
28VE	5.42	2.26	4.81	2.15	.61	1.72	.194	.018		
29ME	5.73	2.02	5.50	1.87	.23	.301	.585	.003		
30ME	5.61	2.02	5.47	1.98	.14	.104	.748	.001		
31PAS	6.27	1.99	7.94	1.35	1.67	23.239	.000*	.200	small	
32	6.97	2.60	6.63	2.61	.34	.368	.546	.004		
33	7.03	2.10	5.11	3.01	1.92	13.860	.000*	.130	small	

Race

The mean responses for each of the 15 items on the TRQ were analyzed based on race using MANOVA, $\alpha = .05$ (Tabachnick & Fidell, 2013). Items 20 and 26 showed significant differences in responses among race. Item 20 is a professional development item and item 26 is a vicarious experience item. The mean response for item 20 for the White subgroup was lower than the mean response from other groups. The mean response for item 26 for the Black or African American subgroup was higher than the mean response from other groups. The Cohen's d statistic yields further insight into these differences. For each of the two items with significant differences, the effect size was small, meaning that the differences among the groups, while significant, are slight.

Results of the MANOVA based on race are shown in Table 4.16 (Tabachnick & Fidell, 2013).

Table 4.16

Comparison of Means for Each Item on TRQ Based on Race

Item	White		Black or African American		Other		F	p	Cohen's d	Effect Size
	M	SD	M	SD	M	SD				
19PAS	7.11	1.32	7.11	1.17	8.50	.71	1.12	.330	.024	
20	4.71	1.79	6.6	1.66	7.50	2.12	7.05	.001*	.132	small
21	4.94	1.56	6.22	2.39	6.00	1.41	2.78	.067	.056	
22 ME	5.41	1.87	6.56	1.81	7.50	2.12	2.63	.077	.054	
23VP	6.95	1.54	7.56	1.94	5.50	4.95	1.36	.263	.028	
24ME	4.22	1.86	5.89	1.45	5.00	.000	3.52	.033	.070	
25VP	6.51	2.06	7.78	1.99	6.50	3.54	1.54	.220	.032	
26VE	4.66	2.04	7.44	1.67	6.0	4.24	7.81	.001*	.144	small
27VE	5.28	1.97	7.00	1.50	4.50	3.54	3.35	.039	.067	
28VE	4.82	2.17	6.89	1.69	6.000	1.41	4.04	.021	.080	
29ME	5.42	1.89	6.78	1.48	7.00	2.83	2.71	.072	.055	
30ME	5.35	1.93	7.00	1.66	6.50	3.54	3.21	.045	.065	
31PAS	7.46	1.67	6.67	2.55	7.00	2.83	.850	.431	.018	
32	6.72	2.62	7.00	2.50	7.00	2.83	.057	.945	.001	
33	5.79	2.97	6.56	2.07	6.00	4.24	.283	.754	.006	

Level of Education

The mean responses for each of the 15 items on the TRQ were analyzed based on the participant's level of education obtained using MANOVA, $\alpha = .05$ (Tabachnick & Fidell, 2013). Items 25 and 29 showed significant differences in responses among

education level. Item 25 is a verbal persuasion item and Item 29 is a vicarious experiences item. The mean response for doctoral candidates for Item 25 was significantly lower than the mean response for participants with other education levels. The mean response for participants with a doctoral degree was significantly lower than other education levels. The Cohen's *d* statistic yields further insight into these differences. For each of the two items with significant differences, the effect size was small, meaning that the differences among the groups, while significant, are slight. Results of the MANOVA based on education level are shown in Table 4.17 (Tabachnick & Fidell, 2013).

Table 4.17
Comparison of Means for Each Item on TRQ Based on Education Level

Item	<u>Bachelor's</u>		<u>Master's</u>		<u>Specialist</u>		<u>Doctoral</u>		<i>F</i>	<i>p</i>	Cohen's <i>d</i>	Effect Size
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
19PAS	7.39	1.09	7.02	1.47	7.14	1.19	7.50	.707	.392	.759	.013	
20	5.94	2.24	5.06	1.762	4.21	1.54	4.00	2.83	3.67	.015	.107	
21	5.83	2.09	5.00	1.59	4.69	1.44	6.00	1.41	2.03	.115	.062	
22 ME	6.33	2.06	5.43	1.92	5.34	1.68	5.00	2.83	1.27	.289	.040	
23VP	7.50	1.34	6.70	1.79	7.24	1.43	5.00	2.83	2.31	.082	.070	
24ME	5.33	1.94	4.36	1.76	4.00	1.85	2.50	.707	2.79	.045	.083	
25VP	7.06	1.80	6.26	2.20	7.21	1.70	3.00	2.83	3.84	.012	.111	small
26VE	5.00	2.91	4.98	2.14	5.03	1.76	2.50	.707	.852	.469	.056	
27VE	6.11	2.59	5.15	1.76	5.66	1.86	2.50	.707	2.67	.052	.080	
28VE	5.94	2.56	4.81	2.11	5.14	1.81	1.00	0	3.77	.013	.110	small
29ME	6.11	2.08	5.57	1.98	5.38	1.68	4.00	1.41	1.03	.382	.033	
30ME	6.22	2.07	5.62	1.94	5.14	1.81	3.00	2.83	2.33	.080	.071	
31PAS	7.06	2.04	7.49	1.69	7.41	1.76	7.00	2.83	.286	.835	.009	
32	7.50	2.33	6.28	2.76	6.79	2.47	8.00	1.41	.980	.406	.031	
33	6.44	2.60	5.89	2.85	5.45	3.16	6.00	4.24	.435	.728	.014	

Note:

Teaching Experience

The mean responses for each of the 15 items on the TRQ were analyzed based on experience level using MANOVA, $\alpha = .05$ (Tabachnick & Fidell, 2013). Item 28 showed significant differences in responses among experience level. Item 28 is a vicarious experience item. The mean response for item 28 for the experienced teacher group was lower than the mean response from other groups. The Cohen's d statistic yields further insight into these differences. For the item with significant differences, the effect size was small, meaning that the difference among the groups, while significant, is slight. Results of the MANOVA based on teacher experience are shown in Table 4.18 (Tabachnick & Fidell, 2013).

Table 4.18

Comparison of Means for Each Item on TRQ Based on Teacher Experience

Item	<u>New</u>		<u>Inexperienced</u>		<u>Experienced</u>		F	p	Cohen's d	Effect Size
	M	SD	M	SD	M	SD				
19PAS	6.25	1.73	7.83	1.17	7.27	1.13	5.41	.006	.104	
20	5.69	2.09	5.83	1.94	4.72	1.80	2.52	.086	.051	
21	5.31	2.12	4.33	2.34	5.09	1.52	.747	.477	.016	
22 ME	6.13	2.09	6.17	2.04	5.39	1.83	1.32	.273	.028	
23VP	6.87	1.50	6.50	2.17	7.04	1.67	.327	.722	.007	
24ME	4.94	1.84	4.17	1.84	4.30	1.88	.819	.444	.017	
25VP	6.50	2.50	6.33	2.88	6.68	1.95	.107	.898	.002	
26VE	5.87	2.06	5.17	3.25	4.73	2.10	1.87	.160	.039	
27VE	6.69	1.96	6.00	1.67	5.05	1.99	4.66	.012	.091	
28VE	6.44	2.03	6.33	1.37	5.11	2.01	6.14	.003*	.117	small
29ME	5.94	2.08	7.00	1.79	4.64	2.14	2.37	.099	.049	

	<u>New</u>		<u>Inexperienced</u>		<u>Experienced</u>				
30ME	5.94	2.18	6.83	1.72	5.39	1.84	2.03	.137	.042
31PAS	6.88	1.93	7.17	2.23	5.34	1.93	.854	.429	.018
32	6.25	2.44	6.67	3.200	6.86	2.59	.371	.691	.008
33	6.25	2.21	7.00	3.03	5.69	3.02	.734	.483	.016

Research Question Five

To determine the relationship between the dependent variable teacher efficacy and the independent variables mastery experiences, vicarious experiences, verbal persuasions, physiological and affective state, demographic and contextual factors, regression analysis were used. The Pearson product-moment correlation coefficient was used to report the relationships between teacher efficacy and each item on the TRQ (Lomax & Hahs-Vaughn, 2012). The significance level was set at $\alpha = .05$. Multiple regression was used to determine the variables that significantly predicted teacher efficacy and which items of the TRQ were significant predictors of teacher efficacy.

A correlation matrix was used to determine the relationship between teacher efficacy and the four sources of teacher efficacy. Table 4.19 shows the Pearson product moment correlation coefficient for the mean teacher efficacy (TE) score and for the mean score for each of the four factors from the TRQ. 11 items from the TRQ were based upon four factors 1) Mastery Experiences (ME) 2) Vicarious Experiences (VE) 3) Verbal Persuasion (VP) and 4) Physiological and Affective States (PAS). There was a significant positive relationship between TE and three of the sources ME ($r = .443$, $p < .01$), VE ($r = .377$, $p < .01$) and VP ($r = .276$, $p < .01$).

Table 4.19*Correlation Matrix of Relationships Between TE, ME, VE, VP and PAS*

	TE	ME	VE	VP	PAS
TE	-	.443**	.377**	.276**	.138
ME		-	.539**	.466**	-.007
VE			-	.421**	.038
VP				-	-.042
PAS					-

**Significant at .01 level

A correlation matrix was used to determine the relationship between the mean scores for teacher efficacy and the mean scores of each individual item of the Teacher Ratings Questionnaire. Table 4.20 shows the Pearson product moment correlation coefficient for the mean teacher efficacy (TE) score and for the mean scores of each individual item of the Teacher Ratings Questionnaire. There was a significant positive relationship between TE and 12 of the 15 items from the TRQ.

Table 4.20*Correlation Matrix of Relationships Between TE and Individual Items on TRQ*

	TE	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
TE	-	.383**	.342**	.235*	.357**	.175	.372**	.314**	.281**	.377**	.322**	.436**	.421**	-.108	.193	.299**
19		-	.296**	.279**	.174	.225*	.137	.147	.060	.122	.072	.182	.159	.073	.170	.253*
20			-	.610**	.552**	.203*	.555**	.290**	.438**	.460**	.358**	.629**	.651**	.004	.164	.169
21				-	.497**	.395**	.476**	.270**	.321**	.274**	.195*	.380**	.397**	-.231*	.241*	.219*
22					-	.444**	.612**	.419**	.247*	.318**	.379**	.678**	.693**	-.246*	.544**	.369**
23						-	.247*	.660**	.196*	.337**	.279**	.302**	.314**	-.170	.331**	.288**
24							-	.308**	.389**	.342**	.424**	.613**	.617**	-.197*	.216*	.239*
25								-	.240*	.390**	.461**	.448**	.486*	-.179	.190	.109

	TE	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
26									-	.625**	.521**	.445**	.389**	.037	.065	.162
27										-	.620**	.525**	.469**	-.094	.169	.266**
28											-	.479**	.419**	-.045	.132	.159
29												-	.945**	-.057	.366**	.315**
30													-	.366**	.349**	.313**
31														-	.313**	-.365**
32															-	.482**
33																-

**Significant at .01 level *Significant at the .05 level

The strongest positive relationships were between teacher efficacy and two mastery experiences items, item 29 ($r = .436, p < .001$) and item 30 ($r = .421, p < .001$). The effect size of those relationships was small. Table 4.21 shows the Pearson product moment correlation coefficient between teacher efficacy and each item on the TRQ. In the table, the values are organized in descending order and a description of the item as well as the factor the item measures are included.

Table 4.21

Pearson Correlation Coefficient and Effect Size for TE and TRQ Items

Factor					Effect
Item		Description	R	R ²	Size
29	ME	Rate the helpfulness of the informal feedback you receive from campus administrators about your teaching.	.436**	0.190	Small
30	ME	Rate the helpfulness of the informal feedback you receive from campus administrators about your teaching for your annual teacher evaluation.	.421**	0.177	Small
19	PAS	Rate your satisfaction with your professional performance.	.383**	0.147	Small
27	VE	Rate the benefit you receive from observing other teachers on your campus.	.377**	0.142	Small
24	ME	Rate the interpersonal support provided to you by your district personnel.	.372**	0.138	Small
22	ME	Rate the interpersonal support provided to you by campus administrators.	.357**	0.127	Small

Factor				Effect	
Item		Description	R	R ²	Size
20		Rate the helpfulness of professional development activities provided to you by your school district.	.342**	0.117	Small
28	VE	Rate the helpfulness of feedback you receive from teachers who observe you or coach you.	.322**	0.104	Small
25	VP	Rate the benefit you receive from collaborating with your campus colleagues?	.314**	0.099	Small
33		Looking ahead five years, rate the likelihood that you will remain in the teaching profession.	.299**	0.089	Small
26	VE	Rate the availability of opportunities provided to you to observe other teachers.	.281**	0.079	Small
21		Rate the availability of material resources at your school.	.235*	0.055	Small
32		Looking ahead to next year, rate the likelihood that you will remain in this district.	.193	0.037	
23	VP	Rate the interpersonal support provided to you by campus colleagues.	.175	0.031	
31	PAS	Rate the overall level of stress you experience as a teacher.	-.108	0.012	

**Significant at .01 level *Significant at the .05 level

Multiple regression analysis was used to further examine the impact that mastery experiences, vicarious experiences, verbal persuasions, physiological and affective states, gender, race, education level and teacher experience has on teacher efficacy. Standard multiple regression was used to determine how each independent variable contributes to teacher efficacy. With standard multiple regression analysis, each independent variable was entered into the regression equation simultaneously (Tabachnick & Fidell, 2013). The results were analyzed using $\alpha = .05$. A regression equation was found $F(8,85) = 4.820, p < .001$, with an R^2 of .312, explaining approximately 31.2% of the variance in teacher efficacy. The predicted teacher efficacy is equal to $3.783 + .154$ (Mastery experience). The mean teacher efficacy score increased .154 points with the addition of

mastery experience. Mastery experiences were a significant predictor of teacher efficacy. Full results from the regression analysis are found in Table 4.22.

Table 4.22

Predictors of Teacher Efficacy from Multiple Regression Analysis

Variables	β	t	p
Experience	-.004	-.028	.978
Mastery Experience	.154	2.694	.009
Vicarious Experience	.093	1.679	.097
Verbal Persuasion	.045	.865	.390
Physiological and Affective States	.115	1.493	.139
Gender	-.047	-.261	.795
Education Level	.094	.804	.423
Race	.165	1.600	.113

R = .559

R Square = .312

Adjusted R Square = .247

$p < .05$

Stepwise multiple regression was used to determine the impact that each variable measured on the TRQ had on the dependent variable teacher efficacy. At Step 1 of the regression analysis, Item 29, Item 19 and Item 27 from the TRQ were entered into the regression equation and significantly predicted teacher efficacy. The results were $F(1,93) = 24.98$, $p < .001$, where $R^2 = .212$, explaining approximately 21.2% of the variance in

teacher efficacy scores. Results from the stepwise regression analysis are found in Table 4.23.

Table 4.23
Stepwise Regression Analysis

Step	Item	β	t	p
1	29. Rate the helpfulness of the informal feedback you receive from campus administrators about your teaching.	.127	2.852	.005
	19. Rate your satisfaction with your professional performance.	.203	3.593	.001
	27. Rate the benefit you receive from observing other teachers on your campus. (These may be formal or informal observations.)	.094	2.258	.026

Items 19-33 from TRQ were entered into stepwise regression analysis

Summary

To answer the first research question, a factor analysis of the TSES was completed as well as a correlation matrix and reliability coefficient calculations for the TSES and each subscale revealed by the factor analysis. The factor analysis of the TSES resulted in three factors, classroom management, instructional strategies and student engagement, which described 66.4% of the variance in teacher efficacy scores. The mean TSES score was positively correlated with each of the three subscales. The reliability

coefficients for the TSES and for each of the three subscales were calculated using Cronbach's alpha. The reliability coefficients were high, indicating that the TSES scale and the subscales were highly reliable.

To answer the second research question, the mean TSES scores were compared among subgroups. An independent t-test was used to compare the mean TSES scores between males and females. The results from the independent t-test indicated no significant differences among the teacher efficacy scores of males and females. A one-way analysis of variance (ANOVA) was used to compare the mean teacher efficacy scores among the participants' race. The participants responded in three subgroups, White, Black or African American and Other, which were the three subgroups used for the comparison. Results from the ANOVA indicated that differences in the mean teacher efficacy scores among subgroups were significant. Teacher efficacy scores are not equal based upon race. A one-way ANOVA was used to compare the means teacher efficacy scores based upon participants' education level. The four subgroups analyzed were 1) Bachelor's Degree 2) Master's Degree 3) Education Specialist Degree and 4) Doctoral Degree. The results from the ANOVA revealed no significant differences in the mean teacher efficacy scores among education level subgroups. Lastly, a one-way ANOVA was used to compare the means of teacher efficacy scores based upon participants' teaching experience. The three subgroups analyzed were 1) new teachers, 2) inexperienced teachers and 3) experienced teachers. Results from the ANOVA indicated no significant differences among teacher efficacy scores based on level of teaching experience.

To answer research question 3, a factor analysis, correlation of subscales and

reliability coefficients were calculated for the TRQ and each of its subscales. The factor analysis revealed four subscales, which explained 76.12% of the variance in TRQ scores. The four factors were mastery experiences, vicarious experiences, verbal persuasion and physiological and affective states. Scores from the TRQ as well as each of the four subscales were positively correlated with one another, with the exception of the physiological and affective states subscale, indicating that subscale measured a separate and unrelated construct. The reliability coefficients of the TRQ and each of the four subscales were calculated using Cronbach's alpha. Each reliability coefficient was high, indicating that the TRQ is a reliable measure of the sources of teacher efficacy.

To answer the fourth research question, the mean TRQ scores for each item of the TRQ were compared among subgroups. Multiple analysis of variance (MANOVA) was used to compare the mean TRQ scores for each item on the TRQ among subgroups and Cohen's d was calculated to determine the magnitude of those differences. The results indicated slight but significant differences between males and females for Item 31, a physiological and affective states item and Item 33, which was based on teacher retention. The results also indicated slight but significant differences among race subgroups for Item 20, which was professional development and Item 26, which was vicarious experiences. There were slight but significant differences among education level for Item 25, which was verbal persuasion and Item 29, which was a vicarious experience item. Lastly, there were slight but significant differences based on level of teaching experience for Item 28, which was a vicarious experience item.

To answer research question five, regression analysis was used to determine significant predictors of teacher efficacy and a correlation matrix was used to determine

the relationships among different variables in the study. The Pearson product-moment correlation coefficients showed significant positive relationships between teacher efficacy, mastery experiences, vicarious experiences and verbal persuasions. The Pearson product-moment correlation coefficients showed significant positive relationships between teacher efficacy and each Item of the TRQ, with the exception of Items 23, a verbal persuasion item, Item 31, a physiological and affective states item and Item 32, a teacher retention item. To determine the magnitude of those positive relationships, an effect size was calculated. The strongest correlations were found between teacher efficacy and two mastery experiences items, Item 29 and Item 30. The magnitude of these correlations was small according the effect size calculations.

Multiple regression was used to determine how each independent variable contributes to teacher efficacy. Results from the multiple regression analysis indicated that mastery experience was the only independent variable that was a significant predictor of teacher efficacy and explained approximately 31.2% of the variance in teacher efficacy scores. Lastly, stepwise regression was used to determine which items of the TRQ significantly contributed to teacher efficacy. Results from the stepwise regression analysis indicated that Item 29, a mastery experience item, Item 19 a physiological and affective states item and Item 27, a vicarious experiences item, were significant predictors of teacher efficacy and explained approximately 21.2% of the variance in teacher efficacy scores.

CHAPTER FIVE

DISCUSSION

This chapter will focus on the research findings and discussion and the findings of the research.

A teacher efficacy sense of self-efficacy is an essential component of education. Teacher efficacy is related to positive outcomes for students, such as motivation and achievement, as well as for teachers, such as higher job satisfaction and high teacher retention rates. Self-efficacy is known to come from four sources (1) mastery experiences, (2) vicarious experiences, (3) verbal persuasion, and (4) physiological and affective states (Bandura, 1977), yet more understanding is necessary to determine how teachers form their efficacy beliefs and whether other factors may contribute to the formation of such beliefs. More knowledge in this area could improve teacher preparation programs as well as professional development and professional feedback, which are integral parts of a teacher's career.

The findings from teacher efficacy research have been inconsistent. The lack of consistency in the instrument used to measure teacher efficacy may be one reason for these inconsistencies and different variables used in the research such as participants, gender and experience level may have also contributed to differing conclusions. While teacher efficacy is believed to come primarily from a teacher's own mastery experiences (Bandura, 1997), researchers have suggested that other verbal persuasion may equally impact teacher efficacy. Additionally, little information is known about other variables that may influence teacher efficacy such as demographic factors or the setting in which a

teacher teaches. More specific details are needed for a better understanding about the formation of teacher efficacy beliefs, including variables that may contribute to the formation of teacher efficacy other than the four sources of teacher efficacy as proposed by Bandura (1997).

The current study included 104 participants who were secondary teachers in a single school district in the southeast United States. Each participant answered a 33-item survey that included demographic questions, the TSES to determine teacher efficacy and the TRQ to determine the sources of teacher efficacy. Results from the TSES were analyzed using factor analysis, correlation analysis and descriptive statistics to determine the teacher efficacy scores of the participants. Further analysis was completed using analysis of variance to obtain information about the teacher efficacy of each subgroup of participants, including gender, race, education level and teaching experiences. Factor analysis, correlation analysis and descriptive statistics were also examined on 11 of the 15 items of the TRQ, which were intended to measure the four sources of teacher efficacy. Further analysis using multiple analysis of variance of the 11 items of the TRQ was used to obtain information about the sources of teacher efficacy of each subgroup of the participants. The subgroups examined were gender, race, level of education and teaching experience and included analysis of all 15 items on the TRQ for comparison. Lastly, a correlational analysis was used to determine the relationship between teacher efficacy and each item of the TRQ scale. Multiple regression was used to look for significant predictors of teacher efficacy. Eight variables were entered into the multiple regression 1) mastery experiences, 2) vicarious experiences, 3) verbal persuasion, 4) physiological and affective states, 5) gender, 6) race, 7) education level

and 8) teaching experience. Stepwise regression was used to determine individual items on the TRQ that predicted teacher efficacy.

Research Findings

Research Question One

The instrument used to measure teacher efficacy was the short form Teachers' Sense of Efficacy Scale (TSES), developed by Tschannen-Moran and Woolfolk Hoy (2001b). The TSES short form consists of 12 questions with a nine-point scale for responses. The nine-point scale has anchors at 1 – nothing, 3 – very little, 5 – some influence, 7 – quite a bit, and 9 – a great deal. First the scores from the TSES were examined to determine teacher efficacy among the participants. A factor analysis of the TSES was completed, as suggested by researchers Tschannen-Moran and Woolfolk Hoy (2001) in their scoring instructions for the TSES. The factor analysis showed that the 12 items on the short form TSES measured three distinct factors, classroom management, instructional strategies and student engagement. Based on the correlation matrix, each of the factors positively correlated with one another as well as with the construct of teacher efficacy. The mean teacher efficacy score was $M = 6.64$ ($SD = .86$).

Research Question Two

To answer the second research question, mean teacher efficacy scores were compared by subgroups according to participant's gender, race, education level and teaching experience. Results from the independent t-test revealed no significant differences in the teacher efficacy based on participant's gender. Based on the findings from the analysis of variance, there were significant differences among teacher efficacy

scores based on participant's race. Three subgroups of race were examined 1) White 2) Black or African American and 3) Other. Results from the analysis of variance revealed no significant differences in the teacher efficacy scores based on participant's level of education or teaching experience. Four education levels were examined 1) Bachelor's degree 2) Master's degree 3) Education Specialist Degree and 4) Doctoral Degree. Three experience levels were examined 1) new teachers with less than three years of experience 2) inexperienced teachers with between four and five years of experience and 3) experienced teachers with greater than five years experience.

Research Question Three

The final portion of the research instrument was 15 items to determine the sources of their teacher efficacy. To measure the sources of teacher efficacy, an adapted version of the Teacher Ratings Questionnaire (TRQ) was used (Weaver Shearn, 2007). The TRQ for the current study was adapted for inservice teachers, as the original form was designed for preservice teachers. The TRQ was based the same nine-point response scale as the TSES. The nine-point scale had anchors where 1 is none at all, 3 is very little, 5 is some degree, 7 is quite a bit and 9 is a great deal. A factor analysis of the TRQ was completed, as was done by Weaver Shearn in her 2007 study. The factor analysis showed that the 11 items on the TRQ measured four distinct factors, 1) mastery experiences, 2) vicarious experiences, 3) verbal persuasions and 4) physiological and affective states. Four items were not included in the factor analysis because those items were not related to the four sources of teacher efficacy. The reliability coefficient for the scale was .84. A correlation analysis was examined that showed positive relationships between the scale total and each of the subscales, except the subscale measuring

physiological and affective states. The mean teacher efficacy score for each of the subscales was $M = 5.20$ for mastery experiences, $M = 5.10$ for vicarious experiences, $M = 6.73$ for verbal persuasion and $M = 7.26$ for physiological and affective states.

Research Question Four

Analysis of variance was used to compare means among subgroups to determine if there were difference in teacher efficacy. Each of the 15 items of the TRQ was analyzed using multiple analysis of variance to compare the teacher efficacy. For the gender subgroup, Item 31 (psychological and affective states) and Item 33 (teacher retention) had significant differences in mean scores for teacher efficacy. In the race subgroup, Item 20 (professional development) and Item 26 (vicarious experiences) had significantly different mean teacher efficacy scores. In the subgroup of education level, Item 25 (verbal persuasions) and Item 29 (mastery experiences) had significantly different teacher efficacy scores. For teacher experience, there were significant differences in the mean teacher efficacy score for Item 28 (vicarious experiences).

Research Question Five

Regression analysis was used to determine which variables predicted teacher efficacy. Using multiple regression analysis, the mean teacher efficacy scores for mastery experiences, vicarious experiences, verbal persuasions, physiological and affective states, gender, race, education level and teaching experience were analyzed to determine significance as predictive variables of teacher efficacy. Results from the regression analysis revealed that mastery experience was a predictive variable for participant's teacher efficacy. Stepwise regression analysis was used to determine which

items of the TRQ predicted teacher efficacy. Based on the results from the stepwise regression, Item 29 (mastery experiences), Item 19 (physiological and affective states) and Item 27 (vicarious experiences) were found to be significant predictors of teacher efficacy.

Discussion

Research Question One

The results from the factor analysis of the TSES were similar to the results found by Tschannen-Moran and Hoy (2001). Three different factors were measured by the TSES including classroom management, instructional strategies and student engagement. There was a difference in one question's factor loading as compared to that of Tschannen-Moran and Hoy (2001). Item 17 loaded on the factor in the current study, but loaded on the student engagement factor in the original research (Tschannen-Moran & Hoy, 2001). The mean teacher efficacy ($M = 6.64$) scores for classroom management ($M = 6.82$), instructional strategies ($M = 7.00$) and student engagement ($M = 5.76$). These are similar to those reported by Tschannen-Moran and Hoy (2001) where mean teacher efficacy ($M = 7.1$) scores for classroom management ($M = 6.7$), instructional strategies ($M = 7.3$) and student engagement ($M = 7.2$). The reliability coefficient for the overall scale in the current study was .860 as compared to .90 in the original research (Tschannen-Moran, 2001). The reliability coefficients for the subscales were classroom management .88, instructional strategies .77 and student engagement and .78. These were similar to the reliability coefficients stated by the authors for the short form of the TSES were .86 for classroom management, .86 for instructional strategies, and .81 for

student engagement (Tschannen-Moran & Hoy, 2001). The scale used in this study was a valid and reliable scale to measure teacher efficacy due to its similarities of the TSES as reported by the authors (Tschannen-Moran & Woolfolk Hoy, 2001).

Research Question Two

Gender

The findings from the current study showed no significant differences in teacher efficacy based on the gender of the participants. Tschannen-Moran and Woolfolk Hoy (2007) also reported no significant differences in teacher efficacy based on gender of the participants in their study. However, Coladarci (1992) and Alijinan (2012) each reported significant differences in teacher efficacy based on gender. Tajeddin & Khodaverdi (2011) found significant differences in teacher efficacy on only one subscale of their instrument, but the instrument used was not the TSES.

Race

The findings from the current study showed significant differences in teacher efficacy based on the race of the participants. Milner and Woolfolk Hoy (2003) reported in their qualitative study, that race had a negative effect on the teacher efficacy of an African American teacher. Two additional studies reported race as influential on teacher efficacy, but each of those studies focused on the racial make up of students rather than the race of participants. Olsen (2008) stated that the racial makeup of students had no significant effect on teacher efficacy. Bloom & Peters (2012) reported that teacher efficacy decreased as the number of non-white students in the classroom increased.

Education Level

According to the findings in the current study, there were no significant differences in the mean scores of teacher efficacy based on the education level of the participants. Milner and Woolfol Hoy (2003) reported in their qualitative study that one participant's teacher efficacy increased after obtaining a doctorate degree. Kayaoglu (2011) suggests that education level may make a difference in teacher efficacy as one participant noted that intense college preparation may have made a difference in their efficacy. Ross & Bruce (2007) suggested that increased content knowledge could improve teacher efficacy.

Experience

According to the findings in the current study, there were no significant difference in the mean scores of teacher efficacy absed on the experience level of the participants. Coladarci (1992) found no significant differences in teacher efficacy according to experience level. Nor did Wolters and Daugherty (2007) or Tajeddin and Khodaverdi (2011), although they reported differences in teacher efficacy, albeit insignificant differences. However, Tschannen-Moran and Woolfol Hoy (2007) reported significant diffrences between new and experienced teachers, along with Alijinan (2012) and Putnam (2012). Klassen & Chiu also reported that teacher efficacy increased as teacher experience increased.

Research Question Three

The results from the factor analysis of the TRQ were similar to the results found by Weaver Shearn (2007). Four different factors were measured by the TRQ including mastery experiences, vicarious experiences, verbal persuasion and physiological and

affective states. Each item of the TRQ loaded on the same factor as those in the original study completed by Weaver Shearn (2007). A correlation analysis was examined that showed positive relationships between the scale total and each of the subscales. The mean teacher efficacy score for each of the subscales was $M = 5.20$ for mastery experiences, $M = 5.10$ for vicarious experiences, $M = 6.73$ for verbal persuasion and $M = 7.26$ for physiological and affective states. The reliability coefficient for the overall TRQ scale was .84 as compared to .90 in the original scale (Weaver Shearn, 2007). The reliability coefficients for the subscales were .90 for mastery experiences, .81 for vicarious experiences, .78 for verbal persuasion and .13 for physiological and affective states.

The results of the factor loadings from the factor analysis showed that some of the items measured a different factor than originally intended. Originally, Item 19 and Item 30 were intended to assess the mastery experiences, but results from the factor analysis showed that mastery experiences were assessed with Items 22, 24, 29, and 30. Originally, Items 25, 26, 27, 28 and 29 were intended to measure vicarious experiences, but results from the factor analysis showed that verbal persuasions were measured with Items 26, 27 and 28. Initially, Items 22, 23, and 24 were intended to measure vicarious experiences, but based on the factor analysis results, verbal persuasions were measured with Items 23 and 25. Item 31 was originally thought to be the only item to measure physiological states, but the factor analysis showed that Item 19 and Item 31 measured physiological and affective states.

Research Question Four

Four education levels were examined 1) Bachelor's degree 2) Master's degree 3) Education Specialist Degree and 4) Doctoral Degree. Three experience levels were examined 1) new teachers with less than three years of experience 2) inexperienced teachers with between four and five years of experience and 3) experienced teachers with greater than five years experience. Three subgroups of race were examined 1) White 2) Black or African American and 3) Other.

Analysis of variance was used to compare means among subgroups to determine if there were difference in teacher efficacy. Each of the 15 items of the TRQ was analyzed using analysis of variance to compare the teacher efficacy. For the gender subgroup, Item 31 (Rate the overall stress you experience as a teacher) and Item 33 (Looking ahead five years, rate the likelihood that you will remain in the teaching profession) had significant differences in mean scores for teacher efficacy. In the subgroup of education level, Item 25 (Rate the benefit you receive from collaborating with campus colleagues) and Item 28 (Rate the helpfulness of feedback you receive from teachers who observe you or coach you) had significantly different teacher efficacy scores. In the race subgroup, Item 20 (Rate the helpfulness of professional development activities provided to you by your school district) and Item 26 (Rate the availability of opportunities provided to you to observe other teachers) had significantly different mean teacher efficacy scores. For teacher experiences, there were significant differences in the mean teacher efficacy score for Item 28 (Rate the helpfulness of feedback you receive from teachers who observe you or coach you). The results from the current study differed from previous research where no demographic variables were significantly related to teacher efficacy (Tschannen-Moran and Woolfolk Hoy, 2007).

Research Question Five

Using multiple regression analysis, mastery experience was a predictive variable for participant's teacher efficacy. Stepwise regression analysis was used to determine which items of the TRQ predicted teacher efficacy. Based on the results from the stepwise regression, Item 29 (Rate the helpfulness of informal feedback you receive from campus administrators about your teaching), Item 19 (Rate your satisfaction with your professional performance) and Item 27 (Rate the benefit you receive from observing other teachers on your campus) were found to be significant predictors of teacher efficacy. Item 29 was a question that measured mastery experiences, item 19 measured physiological and affective states and item 27 measured vicarious experiences.

Mastery Experiences

Mastery experiences were reported by several researchers (Can, 2015; Hand & Stuart, 2012; Kahyaoglu, 2011; Maw & Swe, 2011; Mohamedi & Asadzadeh, 2012; Oh, 2011) as a main source of teacher efficacy. Mohamedi and Asadzadeh (2012) reported mastery experiences as a dominant source of teacher efficacy in their study of 284 Iranian high school teachers. In Oh's (2011) study, mastery experiences predicted teacher efficacy for preservice teachers. Maw and Swe (2011) also reported that mastery experiences were significantly correlated with teacher efficacy and were a significant predictor of teacher efficacy in their quantitative study of 500 student teachers in Myanmar. However, Morris (2010) reported none of the four sources of efficacy predicted efficacy of classroom management for inservice teachers (Morris, 2010). Ross and Bruce (2007) also reported no gains in teacher efficacy through mastery experiences based on implementing strategies learned in professional development. Tschannen-

Moran and Woolfolk Hoy (2007) reported that teacher satisfaction was a significant predictor of teacher efficacy.

Mastery experiences was not as significant of a predictor variable for teacher efficacy as in previous studies (Tschannen-Moran & Woolfolk Hoy, 2007), which may be due to the types of questions that addressed mastery experiences. Mastery experiences have been described as perceived instructional success, content and instructional mastery, student progress (Morris & Usher, 2011) achieving set goals (Milner & Woolfolk Hoy, 2003), student problem solving and student interest (Kahyaoglu, 2011). One study reported mastery experiences for new teachers were based on help from mentors as influencing teacher efficacy (Hand & Stuart, 2012). Mastery experiences with negative impact on teacher efficacy have been reported as lack of student understanding and interest, lack of prior student knowledge, problem students and problems within the classroom (Kahyaoglu, 2011). In the current study, the item addressing help from mentors was removed from the TRQ instrument. There were no items on the TRQ instrument that addressed goal setting, student progress, student interest or problem solving or content mastery.

Physiological and Affective States

Physiological and affective states are the least influential source of teacher efficacy. Educational researchers have reported varying results. Oh (2011) reported that preservice teachers' physiological state predicted their efficacy for classroom management. In a case study completed by Milner and Hoy (2003), they found that physiological and affective states in the form of isolation and lack of acceptance from

peers did influence one teacher's sense of efficacy. In contrast, Kahyaoglu (2011) found that teachers' physiological states had almost no impact on teacher efficacy.

Findings

This study contributed to the research field on teacher efficacy by providing insight about the sources of teacher efficacy among high school teachers in the southeast.

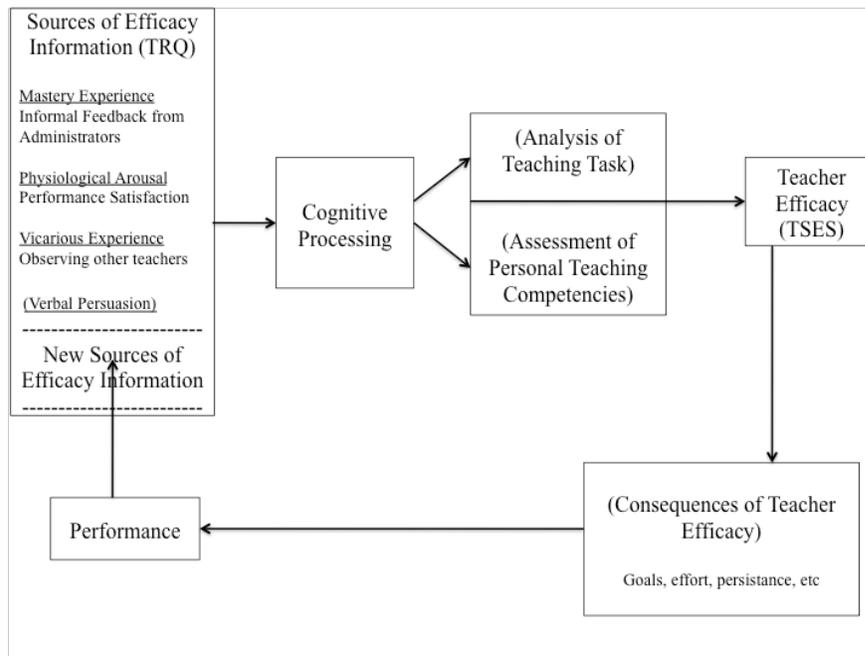
- The TSES, the measurement used for teacher efficacy, and the TRQ, the instrument used for the sources of teacher efficacy were further confirmed in this study. A factor analysis of both instruments yielded similar results to previous studies (Tschannen-Moran & Woolfolk Hoy, 2001; Weaver Shearn, 2007).
- The factor analysis of the TRQ showed that the TRQ did in fact measure four factors, which were the four sources postulated by Bandura (1997). Strong reliability coefficients from the instrument further validated the instrument.
- Based on the research from the current study, there is sufficient evidence to support race as an influential factor in a teacher's efficacy. The teacher efficacy scores were examined according to race in two different ways and each yielded some form of significant differences among racial subgroups. First, there were small but significant differences among the mean teacher efficacy scores from the TSES based on participants' race. Second, there were small but significant differences among responses to certain items on the TRQ based on participants' race.
- The current study also revealed that physiological and affective states can be a significant variable related to teacher efficacy. While the variable of physiological and affective states has rarely been present in previous literature,

this study suggests that a teacher's emotions toward teaching may influence their teacher efficacy.

- Mastery experiences, while influential, were not as strong of an influence to teacher's efficacy as compared to previous research. This may be due to a lack of question on the research instrument regarding different types of mastery experiences. The influence of mastery experiences on a teacher's efficacy is significant, but may have been inadequately measured in the current study.
- The model of teacher efficacy (Tschannen-Moran & Woolfolk Hoy, 2007) was partially supported by the findings in the current study. In the proposed model, verbal persuasion and vicarious experience were thought to be a source of teacher efficacy, but were not a significant source in the current study. The model also includes analysis of the teaching task and assessment of personal teaching competence as significant predictors of teacher efficacy, but those were not found to be significant predictor variables in the current study. Figure 5 shows the model of teacher efficacy with significant predictive variables from the current study. Variables with no significance are shown in parentheses in Figure 5. The lack of adherence to the model may be because the current sample had mostly experienced teachers and the TRQ instrument was designed for first year teachers. It is possible that the Analysis of the Teaching Task and Personal Teaching Competence need to be measured differently for first year teachers and for experienced teachers.

Figure 5

Teacher Efficacy Theoretical Model with Outcomes from Current Sample



Conclusion

Implications

According to the National Center for Educational Statistics (NCES), eight percent of teachers left the profession in the 2011-2012 school year and seven percent of teachers left the profession in the 2012-2013 school year (NCES, 2014). This is an increase from the percentage of teachers leaving the profession in the 1994-1995 school year, which was approximately six and a half percent (NCES, 1995). In the 2012-2013 school year, 51 percent of teachers reported a more manageable workload after leaving the teaching profession and 53 percent of teachers reported improved work conditions after leaving the teaching profession. In the same year, 13 percent of public school teachers moved schools. Of those 13 percent, 23 percent moved due to school factors, five percent for job assignment and classroom factors and four percent moved for salary and other job

benefits. Also, 21 percent of teachers with one of two years of teaching experience either left the field altogether or moved schools (NCES, 2014). In the 2011-2012 school year, approximately 45 percent of teachers with five years or less of teaching experience did not feel prepared or felt only somewhat prepared to handle classroom management. Additionally, those teachers had the same feelings about their ability to use a variety of instructional materials in the classroom (NCES, 2012).

The purpose of this study was to learn more about how teachers form their efficacy beliefs, which can positively impact education such as teacher retention, job satisfaction, classroom management and classroom innovation. According to the data listed above, these are problem areas in education. With this study, mastery experiences in the form of administrative evaluations were clearly identified as influential in the formation of teacher efficacy beliefs. Physiological and affective states in the form of job satisfaction and verbal persuasions in the form of observing other teachers were also identified as predictors of teacher efficacy. A teacher's race was found to impact teacher efficacy as well. From this study, one can better identify exactly how mastery experiences, physiological and affective states and verbal persuasion may influence a teacher's efficacy. Based on the results of this study, it is likely that a teachers' own demographics, which are beyond their control, may influence their efficacy beliefs. With the specifics from this study, teacher preparation programs, professional development and school leaders can work to improve teacher efficacy by focusing on the specific ways teachers in this study formed their efficacy beliefs.

Future Research

To better understand how variables related to teacher efficacy contribute to a teacher's efficacy, there is a need for more comprehensive research in the field. Based on the sample size in the current study, future research may need to have a much larger sample and a more diverse sample. A larger and more diverse sample would potentially make the study generalizable to the population, as the findings related to race and teacher experience may be more accurate. A larger sample size would also further validate the results from the factor analysis of the TRQ in the current study.

Second, a more adequate scale is needed to measure the sources of teacher efficacy for teachers of all levels, especially those with experience. In the current study, mastery experiences and physiological states explained a relatively small portion of the total variance in teacher efficacy. The small percentage may be because the sources of teacher efficacy were not adequately measured by the TRQ scale. The lack of adequacy of the scale was further outlined in the current study due to its lack of adherence to the theoretical model. Since the theoretical model was only partially adhered to in the current study, a suggestion for future research would be to modify the scale to more accurately measure verbal persuasion, analysis of the teaching task and personal teaching competency, especially for teachers with more than five years of experience.

Based on the results from the data analysis, it is possible that job related stress should be further researched as a source of teacher efficacy. Job satisfaction and administrative evaluations, which were found to be significant predictors of teacher efficacy in the current study, may be related to stress on the job. Stress may be an underlying construct that impacts teacher efficacy and should be analyzed for greater understanding.

Lastly, a study that involves qualitative research would be helpful to better understand how teachers build their efficacy. For future research, it would be beneficial to engage the participants in conversation about how they build their efficacy beliefs. With verbal responses in the form of interviews or focus groups, one could gain an in depth understanding about the experiences that have created efficacy beliefs for teachers.

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doi:<http://dx.doi.org/10.3102/00028312031004845>

Appendix A

Informed Consent

You are being asked to participate in a research project conducted by Leah Selbie, a doctoral candidate in the Department of Education at Columbus State University. This project is supervised by Dr. Margie Yates at Columbus State University.

The purpose of this project is to determine the possible sources that help shape teacher's efficacy beliefs. Teacher efficacy is a teacher's belief in their ability to achieve a desired outcome in the classroom. A request to complete the survey was sent to your email address and should take no longer than 10 minutes to complete. A reminder flyer will also be placed in your teacher mailbox. No compensation will be given for completing this survey.

The results from this survey may yield valuable insight regarding factors that may benefit new teachers, experienced teachers, educational leaders and future teachers. The survey results may potentially provide information that could help retain new teachers in the field of education, increase satisfaction among current teachers, give educational leaders knowledge of positive and negative influences on teachers and better prepare future teachers.

Responses to this survey are anonymous and no attempt will be made to identify participants. Data from this survey will be viewed by the Principal Investigator and data will be analyzed based on all responses, not individual responses. Your participation in this research study is voluntary. You may withdraw from the study at any time and your withdrawal will not involve penalty of loss of benefits.

For additional information about this research project, you may contact the Principal Investigator, Leah Selbie at LaGrange High School at 706-883-1590 or selbie_leah@columbusstate.edu. If you have questions about your rights as a research participant, you may contact Columbus State University Institutional Review Board at irb@columbusstate.edu.

Check
One

I have read this informed consent form. If I had any questions, they have been answered. By answering here, I agree to participate in this research project.

I do not agree to participate in this research project

Appendix B

Survey Instrument

Teacher Demographics

-
- | | | |
|---|---|--|
| 1 | How many years have you been teaching? | |
| 2 | What is your gender | A-Male
B-Female |
| 3 | What is your highest level of education obtained? | A-Less than Bachelor Degree
B-Bachelor degree
C-Master degree
D-Education Specialist
E-Doctoral Degree |
| 4 | With which race do you identify? | A-White
B-Black or African American
C-American Indian or Alaska Native
D-Asian
E-Native Hawaiian or Other Pacific Islander |
| 5 | What subject do you teach? (Mark all that apply.) | A-English/Language Arts
B-Mathematics
C-Science
D-Social Studies
E-Other |
| 6 | What grade do you teach? (Mark all that apply.) | A-9 th
B-10 th
C-11 th
D-12 th |

TSES Short Form Instrument

Directions: This questionnaire is designed to help gain a better understanding of the kinds of things that create difficulties for teachers in their school activities.

Rate the extent of your personal thoughts and feelings about each question. You may answer directly below any of the five descriptors or you may answer in between each one, depending upon the degree of your opinions. There is no right or wrong answer and your responses are confidential.

Teacher Beliefs		How much can you do?								
		Nothing		Very Little		Some Influence		Quite a Bit		A Great Deal
		1	2	3	4	5	6	7	8	9
7	How much can you do to control disruptive behavior in the classroom?	1	2	3	4	5	6	7	8	9
8	How much can you do to motivate students who show low interest in school work?	1	2	3	4	5	6	7	8	9
9	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
10	How much can you do to help your students value learning?	1	2	3	4	5	6	7	8	9
11	To what extent can you craft good questions for your students?	1	2	3	4	5	6	7	8	9
12	How much can you do to get children to follow classroom rules?	1	2	3	4	5	6	7	8	9
13	How much can you do to calm a student who is disruptive or noisy?	1	2	3	4	5	6	7	8	9
14	How well can you establish a classroom management system with each group of students?	1	2	3	4	5	6	7	8	9
15	How much can you use a variety of assessment strategies?	1	2	3	4	5	6	7	8	9
16	To what extent can you provide an alternative explanation or example when students are confused?	1	2	3	4	5	6	7	8	9
17	How much can you assist families in helping their children do well in school?	1	2	3	4	5	6	7	8	9
18	How well can you implement alternative strategies in your classroom?	1	2	3	4	5	6	7	8	9

Teacher Ratings Questionnaire (adapted)

Directions: This questionnaire is designed to help obtain a better understanding of what supports are helpful to teachers.

Rate the extent of your personal thoughts and feelings about each question. You may answer directly below any of the five descriptors or you may answer in between each one, depending upon the degree of your opinions. There is no right or wrong answer and your responses are confidential.

Teacher Beliefs		How much can you do?								
-----------------	--	----------------------	--	--	--	--	--	--	--	--

Teacher Beliefs		How much can you do?								
		None at all	Very Little	Some Degree	Quite a Bit	A Great Deal				
19	Rate your satisfaction with your professional performance.	1	2	3	4	5	6	7	8	9
20	Rate the helpfulness of professional development activities provided to you by your school district.	1	2	3	4	5	6	7	8	9
21	Rate the availability of material resources at your school.	1	2	3	4	5	6	7	8	9
22	Rate the interpersonal support provided to you by campus administrators.	1	2	3	4	5	6	7	8	9
23	Rate the interpersonal support provided to you by campus colleagues.	1	2	3	4	5	6	7	8	9
24	Rate the interpersonal support provided to you by your district personnel.	1	2	3	4	5	6	7	8	9
25	Rate the benefit you receive from collaborating with your campus colleagues?	1	2	3	4	5	6	7	8	9
26	Rate the availability of opportunities provided to you to observe other teachers.	1	2	3	4	5	6	7	8	9
27	Rate the benefit you receive from observing other teachers on your campus.	1	2	3	4	5	6	7	8	9
28	Rate the helpfulness of feedback you receive from teachers who observe you or coach you.	1	2	3	4	5	6	7	8	9
29	Rate the helpfulness of the informal feedback you receive from campus administrators about your teaching.	1	2	3	4	5	6	7	8	9
30	Rate the helpfulness of the informal feedback you receive from campus administrators about your teaching for your annual teacher evaluation.	1	2	3	4	5	6	7	8	9
31	Rate the overall level of stress you experience as a teacher.	1	2	3	4	5	6	7	8	9
32	Looking ahead to next year, rate the likelihood that you will remain in this district.	1	2	3	4	5	6	7	8	9
33	Looking ahead five years, rate the likelihood that you will remain in the teaching profession.	1	2	3	4	5	6	7	8	9

Appendix C

Permission to use each instrument



ANITA WOOLFOLK HOY, PH.D.

PROFESSOR
PSYCHOLOGICAL STUDIES IN EDUCATION

Dear

You have my permission to use the *Teachers' Sense of Efficacy Scale* in your research. A copy the scoring instructions can be found at:

<http://u.osu.edu/hoy.17/research/instruments/>

Best wishes in your work,

A handwritten signature in black ink that reads "Anita Woolfolk Hoy".

Anita Woolfolk Hoy, Ph.D.
Professor Emeritus

COLLEGE OF EDUCATION
29 WEST WOODRUFF AVENUE
COLUMBUS, OHIO 43210-1177

WWW.COE.OHIO-STATE.EDU/AHOY

PHONE 614-292-3774
FAX 614-292-7900
HOY.17@OSU.EDU

Dear Leah,
I give my permission for you to use and adapt my Teacher Ratings Questionnaire. I am very pleased to know that you will be investigating teacher efficacy.
Good luck!
Nancy Shearn
2247 Buroak Ridge
San Antonio, TX 78248
210-492-7180

Appendix D

Email Script – First Iteration

You are being asked to take part in a research study completed by Leah Selbie, a doctoral candidate at Columbus State University. The purpose of the study is to determine your perceptions regarding teacher efficacy, which is your belief in your own ability to achieve a desired outcome in your classroom. The following survey should take approximately 10 minutes and will be available until March 24, 2015.

Please follow the link below to review the informed consent and complete the survey. You can use the link below to complete the survey if you previously started it but were unable to finish.

Thank you in advance for taking the time to share your honest thoughts, as they are a valuable part of the research.

Survey Link: http://columbusstate.qualtrics.com/SE/?SID=SV_eLnnMxn51KV4Q0B

Reminder Email Script – Second Iteration

This is a reminder to take part in a research study completed by Leah Selbie, a doctoral candidate at Columbus State University. The purpose of the study is to determine your perceptions regarding teacher efficacy, which is your belief in your own ability to achieve a desired outcome in your classroom. The following survey should take approximately 10 minutes and will be available until March 25, 2015.

Please follow the link below to review the informed consent and complete the survey. You can use the link below to complete the survey if you previously started it but were unable to finish.

Thank you in advance for taking the time to share your honest thoughts, as they are a valuable part of the research.

Leah Selbie

Final Reminder Email Script – Third Iteration

Teachers,

This is the final reminder to take part in a research study completed by Leah Selbie, a doctoral candidate at Columbus State University. The purpose of the study is to determine your perceptions regarding teacher efficacy, which is your belief in your own ability to achieve a desired outcome in your classroom. The following survey should take approximately 10 minutes and will be available until March 24, 2015.

Please follow the link below to review the informed consent and complete the survey. You can use the link below to complete the survey if you previously started it but were unable to finish.

Thank you in advance for taking the time to share your honest thoughts, as they are a valuable part of the research.

Leah Selbie

Follow this link to the Survey:

Take the Survey

Or copy and paste the URL below into your internet browser:

http://columbusstate.qualtrics.com/SE?Q_SS=3Qv3fvsIT5BRuD_0qQmmiAoFHyyA6N&Q_CHL=email

Follow the link to opt out of future emails: [Click here to unsubscribe](#)

Appendix E

IRB Application

Human Research Application

SECTION A: PROJECT INFORMATION

1. **Title of Project:** Examining the Sources of Teacher Efficacy and How the Context of Teaching Contributes to Teacher Efficacy

2. **Application Type:**

- New Project
 Resubmission
 Continuing Project (Previous IRB number: ___)

3. **Principal Investigator:**

(There is only one principal investigator. List the primary contact person as the PI.)

Name: Leah Selbie

Title: Student - Doctoral Candidate

Department Name: Education and Health Professions

Mailing Address: 107 Millridge Drive LaGrange, GA 30240

Phone: 706-302-1311E-Mail: selbiell@columbusstate.edu

4. **Co-Principal Investigator:**

(For student project, thesis, or dissertation, the faculty supervisor serves as the Co-PI. If you are not affiliated with CSU, then you must list a faculty member as the Co-PI.)

Name: Margie Yates

Title: Associate Professor

Department Name: Education and Health Professions

Mailing Address: Jordan Hall 103A

Phone: 706-507-8507E-Mail: yates_helen@columbusstate.edu

5. Indicate whether personnel from an approved lab setting will be involved in this research.

Yes No

B) If Yes, identify the name of the approved lab:

6. Other Personnel of the Research Team:

(If additional space is needed, insert more rows in the table.)

Name	Email

7. A) Do any of the Investigators or Other Personnel listed in this application have a real, potential, or perceived conflict of interest associated with this study? (See the FAQ webpage for more information.)

Yes No

B) If Yes, identify the individual(s) and explain:

(The conflict must be disclosed in the informed consent process.)

8. Dates of Proposed Research: Begin: February 7, 2016 End: February 21, 2016

9. Is this research project for a CSU dissertation? (If Yes, the signed “Proposal Defense Form” must be included in the Addendum.)

Yes No

Section B: Project Summary

Within 100 words, clearly describe the purpose of the study using lay terminology.

The purpose of this study is to determine the sources of teacher efficacy. Teacher efficacy is a teacher's belief in their ability to achieve a desired outcome in the classroom. Teacher efficacy may be derived from a teacher's demographic characteristics, the context in which they teach or one of four sources of teacher efficacy as defined by Bandura (1997). Those four sources are

teachers' mastery experiences, observing other teacher's experiences, influence from others such as students or administrators and the emotions experienced due to teaching.

Section C: Human Research PARTICIPANTS

1. **Number (or Range) of Participants Needed:** 150-200

2. **Age of Participants:**

- under 18 (Specify age(s): ___)
 18 to 64
 65 and older

3. **Identify the criteria for including, or selecting, participants.**

Participants in the study will be certified teachers in three secondary schools in a school district in the Southeastern United States.

4. **A) Are there any criteria for excluding potential participants?**

- Yes No

B) If Yes, identify the criteria for excluding potential participants.

5. **A) Indicate whether any of these groups will be targeted participants.** (Check all that apply.)

- Pregnant women, neonates, or fetuses
 Prisoners
 Individuals who are cognitively impaired
 Individuals who are economically disadvantaged
 Individual who are mentally ill
 Individuals who are terminally ill
 Individuals who have HIV or AIDS
 Individuals who have limited English proficiencies

B) Explain the justification for targeting the group(s) checked above in this research project.

C) What additional safeguards will be added to protect the rights and welfare of these groups?

6. A) Do you plan to target individuals who belong to a particular gender, racial, or ethnic group?

Yes No

B) If Yes, specify the targeted group(s) and explain the justification for targeting the particular group(s) in this research project.

7. What is your current and/or future relationship to the participants?

I am a certified teacher in the same school system with the participants.

Section D: Recruitment Procedures

1. How will the participants be recruited? (Check all that apply.)

In person Printed Materials Television/Radio
 Phone call Letters Listserv/Email
 Social Media/Web-based SONA Other (Specify: __)

2. Describe when, where, and how participants will be initially contacted.

(Attach a copy of any printed and/or electronic materials that will be used for recruiting as an addendum.)

The instruments will be administered through Qualtrics to each participant in the study via their school email and they will be asked to respond on a volunteer basis. A list of school email addresses of certified teachers in each school will be obtained from each of the school's principals and those teachers will receive a mass email requesting survey response. An Internet link to the survey will be sent to every certified teacher's school email address in each of the three schools. Principals will give a verbal prompt at a faculty meeting requesting all teachers at each school to complete the survey. Flyers will be placed in each teacher's school mailbox with a reminder to complete the survey.

3. Describe any follow-up recruitment procedures.

The administration of the survey will be done in three waves. The initial wave will be a mass email to all participants with a link to the survey. The email will also include survey

instructions, information about what the survey results are being used for, and a request to complete the survey. After four days, the email addresses of participants who completed the survey will be removed from the initial list of survey recipients and a second request to complete will be sent to the remaining participants who have not completed the survey. The second request will include a reminder email with a link to the survey, survey instructions and information about what the survey results are being used for. Four days later, this process will be repeated and a third prompt for uncompleted surveys will be sent to the remaining participants who have not returned a completed survey. After a total of two weeks have passed from the initial survey request, the period for survey completion will end. Only survey results completed within the two-week period will be used in the data analysis.

4. A) Will participants receive any incentives and/or compensation for their participation?

Yes No

B) If Yes, describe amount and quantity:

Section E: outside performance site

1. A) Does this project involve any collaborating institution and/or performance site outside of the CSU campus (e.g., local public school, participants’ workplace, military base, or hospital)?

Yes No

B) If Yes, list all institutions and sites involved with this research project.

(If additional space is needed, attach a separate sheet as an addendum. For each listed site, attach a Letter of Cooperation written on the institution’s letterhead and signed by the appropriate authorized official(s). See the FAQ webpage for more information.)

Name of Institution	Location (City, State)	written permission and/or current IRB approval
LaGrange High School	LaGrange, Georgia	<input type="checkbox"/> Attached <input checked="" type="checkbox"/> Pending
Troup County Comprehensive High School	LaGrange, Georgia	<input type="checkbox"/> Attached <input checked="" type="checkbox"/> Pending
Callaway High School	LaGrange, Georgia	<input type="checkbox"/> Attached <input checked="" type="checkbox"/> Pending
		<input type="checkbox"/> Attached <input type="checkbox"/> Pending

Name of Institution	Location (City, State)	written permission and/or current IRB approval
		<input type="checkbox"/> Attached <input type="checkbox"/> Pending

Section F: Methods

1. Describe all research study procedures in concise and sequential lay terminology.

1. A list of school email addresses of certified teachers in each school will be obtained from each of the school’s principals. Each certified teacher will receive a mass email with a link to the survey, survey instructions, information about what the survey results are being used for, and a request to complete the survey.
2. Principals will give a verbal prompt at a faculty meeting to all teachers at each school to complete the survey.
3. Flyers will be placed in each teacher’s school mailbox with a reminder to complete the survey.
4. The administration of the survey will be done in three waves. The initial wave was outlined in Step 1. After four days, the email addresses of participants who completed the survey will be removed from the Qualtrics database of survey recipients.
5. The second wave, which will be completed four days after the first wave begun, will include a reminder email with a survey link, instructions, information about what the survey results are being used for. This second request to complete the survey will only be sent to the remaining participants who have not completed the survey.
6. Four days later, a third wave will repeat the survey request process and a third prompt for uncompleted surveys will be sent only to the remaining participants who have not returned a completed survey. After a total of two weeks have passed from the initial survey request, the period for survey completion will end.

2. Indicate the type of data collection. (Check all that apply.)

Behavioral or Physiological Observation
Describe the focus, duration, and number of observations (e.g., EEG, body composition, blood pressure, or time out of seat). Specify how the observations will be recorded.

Specimen Collection

Describe the type of specimen (e.g., blood, saliva, or urine), method of collection, frequency of collection, amount for each collection, and total volume to be collected.

Document and Artifact Collection

Describe any documents or artifacts (e.g., historical papers or student writing samples) that will be collected and used.

Survey, Interviews, and Questionnaires

Describe the setting, mode of administration, and anticipated duration. Attach a participant copy of each measure.

The teacher survey will be administered through email during February 2016 and should not take longer than 10 minutes to complete. Access the survey with this link http://columbusstate.qualtrics.com/jfe/form/SV_eLnnMxn51KV4Q0B

Internet Research

Describe the measures that will be taken to ensure security of data transmitted over the internet (e.g., internet surveys) to remove IP addresses and to protect from unauthorized access.

The survey will be created using Qualtrics, a web-based survey application. The Qualtrics software creates a Response ID, which is randomly generated, for each participant. Each participant's IP address automatically and email address will be recorded. The email addresses will be recorded in order to send reminder emails to those who did not complete the survey on the first or second request. Once the raw data is retrieved from Qualtrics, the IP addresses and email addresses will be deleted from the dataset in order to de-identify the data.

Audio or Video Recording

Describe the setting and anticipated duration. Describe how the audio/video recordings will be stored and how they will be disposed when this research is completed.

Section g: Risks and Benefits

1. A) Estimate the level of risk for participants.

Potential Risk	Not applicable	No More than Minimal Risk	Greater than Minimal Risk
A. Physical	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Psychological	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Social or Economic	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Use of deceptive technique	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Other (Specify: ___)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B) If any of the above risks are greater than minimal risk, describe the severity and likelihood of the indicated risk(s).

2. Explain what steps will be taken to reduce the impact of the indicated minimal and/or greater than minimal risks and protect the participant's welfare.

3. Describe the potential benefits to the participants and/or others as a direct result of this research project.

Learning more about the sources of a teacher's efficacy beliefs can help teacher educators prepare teachers and build the efficacy beliefs of pre-service teachers in a practical way, but to do this, they must have a without a better understanding of those beliefs. Learning more about how teachers form their efficacy beliefs could help school leaders build efficacy beliefs for new teachers as well as career teachers. New teachers may be more likely to remain in the classroom if they are able to build a stronger sense of efficacy. Career teachers may be able to improve their job satisfaction as well as improve student achievement and motivation, as positive student outcomes are positively correlated with high teacher efficacy. Professional development for teachers aimed at increasing efficacy would be possible if there were a better understanding of the formation of a teacher's efficacy beliefs. Additionally, a better understanding of the formation of teacher efficacy beliefs may help to inform school leaders about possible factors that are negatively related to teacher efficacy. If school leaders knew more about variables with a negative impact on teacher efficacy, it is possible that precautions could be taken to avoid decreasing teachers's sense of efficacy.

Section H: Confidentiality of Data

1. A) Will demographic information be collected?

Yes No

B) If *Yes*, list all demographic information that will be collected and describe how the information will be used.

Participants will be asked to provide information about their gender, race, years of teaching experience, level of education, subject and grade they currently teach. The demographic information will be used as an independent variable in the study to determine whether teacher efficacy is influenced by demographic and contextual variables. This information will be used to group participants for data analysis.

2. A) Indicate the degree of confidentiality. (See the FAQ webpage for more information.)

De-identified
 Anonymous
 Coded – Indirect
 Coded – Direct
 Data will not be confidential.

B) If *the data will not be confidential*, explain the rationale.

C) If *indirect or direct coding*, indicate where, how long, and in what format (e.g., paper or electronic files) will the data be kept. Describe the security provisions that will be taken to protect this data.

D) If *indirect or direct coding*, explain why it is necessary to keep indirect or direct identifiers.

E) If *indirect or direct coding*, identify who will have access to the coding and/or individually identifiable information.

SECTION I: INFORMED CONSENT PROCESS

1. **Describe the specific procedures (i.e., how, where, and when) for obtaining informed consent.** (Use provided template available on the CSU IRB website to create an informed consent form and attach a copy as an addendum.)

The informed consent form will be the first screen on the electronic survey. The survey will include a response indicating that participants agree to the informed consent and are willing to participate in the survey.

2. **Provide justification for requesting a waiver to document informed consent.**
(See the *FAQ* webpage for more information.[n/a](#))

Section J: Electronic Signatures

The Research Team, including the Principal Investigator, Co-Principal Investigator, and other personnel, must read and comply with all Columbus State University Institutional Review Board (IRB) Policies and Procedures. In addition, they must abide by all federal, state, and local laws regarding protection of human subjects in research. As the Principal and Co-Principal Investigators, if applicable, you agree to follow these governing guidelines that include, but not limited to, the following policies and procedures. Failure to follow these guidelines may result in delays with the processing of this application and/or future applications.

1. Complete the Human Subjects Research training and submit a training certificate as an addendum.
2. Merge all addendums into one file.
3. Begin recruitment and data collection after receiving notification of final IRB approval.
4. Obtain approval from the IRB prior to instituting any change in project protocol.
5. Obtain informed consent from all participants, and legal parent or guardian, prior to commencing this research study when applicable.
6. Maintain copies of all records and signed consent forms, if required, from each participant for the duration of the project.
7. Notify the IRB regarding any adverse events, unexpected problems, or incidents that involve risks to participants and/or others.
8. Submit the Final Report Form within 12 months from the date of IRB approval using the template available on the CSU IRB website (if applicable).

If this research study is a student-led project, the Co-Principal Investigator, the student's faculty supervisor, must agree to complete the following tasks prior to the submission of the Human Research Application:

- Collaborate with the student to develop the research study.
- Read and review this application with its addendums for content and clarity.
- Guide and oversee the procedures outlined in this application.
- Ensure that all of the Research Team responsibilities are fulfilled.

Enter Principal Investigator's email as an electronic signature. (For authentication purposes, the email address must match the email address on file with Columbus State University.)

Electronic Signature: selbie_leah@columbusstate.edu
2016

Date: January 10,

Enter Co-Principal Investigator's email as an electronic signature. (For authentication purposes, the email address must match the email address on file with Columbus State University.)

Electronic Signature: yates_helen@columbusstate.edu
2016

Date: January 23,

Appendix F

District Permission

Synopsis of Research

The purpose of this study is to determine the sources of teacher efficacy. Teacher efficacy is a teacher's belief in their ability to achieve a desired outcome in the classroom. Teacher efficacy may be derived from a teacher's demographic characteristics, the context in which they teach or one of four sources of teacher efficacy as defined by Bandura (1997). Those four sources are teachers' mastery experiences, observing other teacher's experiences, influence from others such as students or administrators and the emotions experienced due to teaching. The survey instrument will be administered through Qualtrics, an online software application, to each participant in the study via their school email and they will be asked to respond on a volunteer basis. A list of school email addresses of certified teachers in each school will be obtained from each of the school's principals and those teachers will receive a mass email requesting survey response. An Internet link to the survey will be sent to every certified teacher's school email address in each of the three schools. Principals will be asked to give a verbal prompt at a faculty meeting requesting all teachers at each school to complete the survey. Flyers will be placed in each teacher's school mailbox with a reminder to complete the survey.

The Qualtrics software creates a Response ID, which is randomly generated for each participant, but the survey responses from the participants are anonymous. Because the survey will be anonymous, the associated IP address and the email address are removed automatically by Qualtrics upon completion of the survey and never available for my viewing. Survey responses will only have the Response ID, which will be removed for data analysis. The Response ID is not linked to any identifying information from the participants. This is done for the participants' privacy and anonymity.

The administration of the survey will be done in three waves. The initial wave will be a mass email to all participants with a link to the survey. The email will also include survey instructions, information about what the survey results are being used for, and a request to complete the survey. Qualtrics will keep a record of the participants emailed and their completion status for the survey. After four days, the email addresses of participants who completed the survey will be removed from the initial list of survey recipients and a second request to complete the survey will be sent to the remaining participants who have not completed the survey. This list will be available in Qualtrics and contains no survey responses or identifying information that could link a participant with their responses. The second request will include a reminder email with a link to the survey, survey instructions and information about what the survey results are being used for. Four days later, this process will be repeated and a third prompt for uncompleted surveys will be sent to the remaining participants. As previously stated, the completion status for the participants does not include any information that will link a participant to identifying information or a particular survey response. After a total of two weeks

have passed from the initial survey request, the period for survey completion will end.

In order to complete the second and third wave of survey requests, I will need to know who has not completed the survey. I will download an email history through Qualtrics. The email history will include whether the recipient finished the survey, but it does not include their Response ID. Any recipient who did not finish the survey will receive a second and possibly third request, depending on when the survey is completed. The email history does not contain any identifying information except the recipients name, email address and completion status. This procedure is in place for the participants' privacy and anonymity.