AN EXPLORATION OF THE RELATIONSHIPS AMONG TEACHER EFFICACY, COLLECTIVE TEACHER EFFICACY, AND TEACHER DEMOGRAPHIC CHARACTERISTICS IN CONSERVATIVE CHRISTIAN SCHOOLS

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The purpose of this study was to determine whether teachers' perceptions of self-efficacy and collective teacher efficacy are interrelated and how these two constructs may be impacted by teacher demographic characteristics, such as educational level, grade level taught, and number of years of teaching experience. This study focused entirely on the interrelationships of teacher efficacy and collective teacher efficacy in three suburban, conservative Christian schools in north Texas. Specifically, the demographic characteristics of age, gender, ethnicity, particular school campus, number of years teaching, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught were studied for the non-random, convenience sample of 216 kindergarten through twelfth grade teachers.

A correlational analysis of teacher efficacy and collective teacher efficacy yielded a Pearson *r* of .35 at a statistically significant level ($p < .01$); combining these two variables with teacher demographic variables in multiple regression analyses confirmed the relationship between teachers' perceptions of teacher efficacy and collective efficacy at a statistically significant level ($p < .001$). A review of the squared structure coefficients in the first multiple regression analysis ($R^2 = .284$, $p < .001$) showed that individual teachers' perceptions of collective teacher efficacy explained the largest amount (43%) of the variance in teacher efficacy, followed by years of teaching

experience (17%) and number of years of teaching at the current school (14%). A review of the squared structure coefficients in the second multiple regression analysis (R^2 = .395, p < .001) indicated that individual teachers' perceptions of teacher efficacy explained the largest amount of variance in collective teacher efficacy (31%), followed the elementary teacher variable (22%) and particular school (19%).

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

Student achievement, teacher effectiveness, and school improvement are critical components in our educational system and are interdependent. Both teacher effectiveness and school improvement plans are often evaluated by measures of student achievement. A powerful variable that has been shown to positively impact student achievement is teacher efficacy.

Originating in social cognitive theory, beliefs of self-efficacy form the basis for human behavior choices. As individuals, teachers lead their lives and base their actions, including their classroom behaviors, on their perceived self-efficacy. The concepts of teacher efficacy and collective efficacy have their origins in self-efficacy (Bandura, 1986; 1995, 1997, Goddard, 2001; Henson, 2002).

Bandura (1997) refers to perceived self-efficacy as “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (p. 3). For teachers, courses of action include all that is required of a teacher to promote learning in students.

Attention is being given to the concept of teacher beliefs and efficacy across subject areas and disciplines. For instance, educators with a strong perception of teacher efficacy make more positive predictions about their students’ success (Tournaki & Podell, 2005). In a study of special education teachers, those with higher teacher efficacy beliefs set higher goals for their special education students (Allinder, 1995). Research on teachers’ perceptions of efficacy with regard to computers and technology showed a positive impact on the computer skills of students (Ross, Hogaboam-Gray, &

Hannay, 2001). The development of higher standards and improved curricula in science and mathematics may not be successful without also addressing teachers' beliefs about their ability to teach science and math, which has led to the development of instruments to measure science teaching efficacy and mathematics teaching efficacy (Enochs, Smith, & Huinker, 2000; Henson, 2002).

Every teacher must establish a classroom environment conducive to learning. Bandura (1986) reported that teachers' perceptions of their instructional efficacy impact the atmosphere of their classrooms. Other researchers found that a sense of efficacy varied from teacher to teacher and impacted a teacher's behavior in the classroom (Ashton & Webb, 1986). Teachers with a strong sense of their ability to be instructionally effective tend to establish classroom environments with mastery experiences for students (Gibson & Dembo, 1984). Teachers with a high perception of instructional efficacy believe that students are capable and will learn regardless of the students' family background and community environment. Students learn because the highly efficacious teacher manages the classroom and uses instructional strategies to accomplish positive results.

Likewise, on a school-wide level, the faculty as a whole experiences a perception of how well all of the teachers do in educating students. A faculty's belief of their collective efficacy impacts the achievement level of students within a particular school. Considering that the construct of teacher self-efficacy positively influences student achievement (Ashton & Webb, 1986; Bandura, 1993, 1997; Gibson & Dembo, 1984; Tschannen-Moran & Hoy, 2001; Tschannen-Moran, Hoy, & Hoy, 1998) as does collective efficacy (Bandura, 1993, 1997; Goddard 1998, 2001, 2002b; Tschannen-

Moran et al., 1998), continued research on these concepts is valuable to the field of education.

Statement of the Problem

The problem addressed in this study was to determine whether teachers' perceptions of self-efficacy and collective efficacy are interrelated and how these two constructs may be impacted by teacher characteristics, such as educational level, grade level taught, and number of years of teaching experience. Both perceptions of teacher efficacy and collective efficacy have been linked to student achievement in schools, but little research has been done to determine the relationship between these two forms of efficacy. Furthermore, while most efficacy research has been conducted in public schools, little has been done in independent, private schools. This study focused entirely on the interrelationships of teacher efficacy and collective efficacy in suburban, conservative Christian schools.

Purpose

Specifically, the purpose of this study was to explore the relationship between kindergarten through twelfth grade teachers' perceptions of individual teacher efficacy and collective efficacy within a suburban private school setting. In addition, the relationship between selected teacher demographic characteristics on both teacher efficacy and collective teacher efficacy was examined. More specifically, teacher characteristics of age, gender, ethnicity, school campus, number of years teaching, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught were studied. Efficacy scholars recommend the inclusion of

teacher demographic data to determine the possibility of relative effects on teacher efficacy and collective efficacy (Goddard, 2001) and the investigation of possible relationships between teacher efficacy and collective efficacy (Henson, 2001b, 2002; Pajares, 1997; Tschannen-Moran et al., 1998). The existing literature of research studies on perceptions of teacher efficacy and collective teacher efficacy has been limited to public school settings. A study of private schools, which must remain competitive by developing a distinct mission and accountability to parents, may potentially be informative to public school educators as well (Madsen, 1996). Teacher efficacy is a powerful variable that positively impacts student achievement and must be considered in the process of improving schools.

Research Question

The following research question is addressed in this study. What is the relationship between individual conservative Christian school teachers' perceptions of teacher efficacy, perceptions of collective teacher efficacy, and teacher demographic characteristics, including age, gender, ethnicity, school campus, number of years teaching, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught?

Based on a review of literature and my experience in conservative Christian schools, the following research and null hypotheses were made for this study.

Research Hypothesis 1. There is a statistically significant relationship at the .05 level between conservative Christian school teachers' perceptions of individual teacher efficacy and perceptions of collective teacher efficacy.

Research Hypothesis 2. With respect to conservative Christian school teachers, there is a statistically significant relationship at the .05 level for the independent variables of (a) teachers' perceptions of collective teacher efficacy and (b) teacher demographic characteristics (age, gender, ethnicity, school campus, years of teaching experience, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught) and the dependent variable of teachers' perceptions of individual teacher efficacy.

Research Hypothesis 3. With respect to conservative Christian school teachers, there is a statistically significant relationship at the .05 level for the independent variables of (a) teachers' perceptions of individual teacher efficacy and (b) teacher demographic characteristics (age, gender, ethnicity, school campus, years of teaching experience, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught) and the dependent variable of teachers' perceptions of collective teacher efficacy.

Definition of Terms

The following definitions of key terms apply to this study.

Social cognitive theory is theory that emphasizes acquisition of knowledge or learning through the observation of other people (Woolfolk, 1998).

Human agency is "the capability of humans to exercise intentionality by exerting control over their thoughts, their behaviors, and their external environments" (Goddard, 1998, p. 6).

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

Perception of teacher efficacy is the individual teacher’s sense that he or she is capable of positively influencing students and student achievement.

Collective efficacy refers to the perceived “performance capability of a social system as a whole” (Bandura, 1997, p. 469).

Perception of collective teacher efficacy is the perception of teachers within a school of the impact of the efforts of the entire faculty on student learning.

Assumptions

The major assumption related to efficacy research using self-report survey data collected from teachers is that those teachers will be honest and accurate in responding to the survey questions. I assumed that telling teachers there are no right or wrong answers to the questions and that confidentiality was guaranteed would encourage honesty and accuracy in reporting. Specifically, teachers’ perceptions of self-efficacy and collective efficacy were assumed to reflect teachers’ true beliefs, and their demographic information was assumed to be accurate.

Limitations

The primary limitations of this study relate to the type of sample, timing of data collection, and the survey instruments employed to gather teachers’ perceptions. This study focused on data from a non-random, convenience sample of 216 suburban, independent/private, kindergarten through grade twelve schools, therefore affecting the generalizability of the research results. Head administrators from these private schools granted permission for their teachers to participate voluntarily in the survey, and it is

possible that the perceptions of efficacy for teachers included in this study could be different from perceptions of teachers not represented in the study. Additionally, the timing of the data collection might affect results; it is possible that teachers' beliefs about efficacy might be different earlier or later in the school year. Data collection for this research was conducted during the second semester of the school year, specifically during the months of February and March of 2006. It is also possible that teachers might not report their perceptions accurately on the surveys. Furthermore, teachers who do consent to complete the surveys could differ in perceptions of efficacy when compared to teachers who choose not to volunteer to participate in the study. Consequently, any of these factors might affect the research results.

Description of Design

The intent of this study was to investigate whether there are differences in individual teacher's perceptions of self-efficacy by demographic characteristics, including age, gender, ethnicity, school campus, number of years teaching, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught, and whether there are differences in perceptions of collective teacher efficacy by these same demographic characteristics. Additionally, I examined the relationship between private school teachers' perceptions of individual teacher efficacy and collective teacher efficacy. Data collection was accomplished by surveys conducted at regularly scheduled faculty meetings during the months of February and March 2006. For the purposes of this study, quantitative research methods and analyses were used. Correlational analysis between teacher efficacy and collective efficacy was conducted

using the Pearson product moment correlation coefficient to indicate possible relationship and degree of relationship. Multiple regression analyses were used to determine whether perceptions of collective efficacy and teacher demographic characteristics explained any variance in teacher efficacy, and whether perceptions of teacher efficacy and teacher demographic characteristics explained any variance in collective efficacy.

Summary

This chapter provided an introduction to the background and context of teacher efficacy and collective teacher efficacy. In addition, the purpose of the study and the research questions were presented. Terms were defined, assumptions and limitations were discussed, and the description of the design was presented.

CHAPTER 2

LITERATURE REVIEW

Introduction

This chapter provides a review of the literature from the past three decades devoted to the study of efficacy, teacher efficacy, and collective teacher efficacy. Self-efficacy, social cognitive theory, and sources of self-efficacy are described. A brief history of efficacy studies and current research on teacher efficacy and collective efficacy are included. Additionally, information regarding the inclusion of demographic characteristics in efficacy research and the interrelationship between teacher efficacy and collective efficacy are reviewed. Finally, the need for research in private schools is documented.

Self-Efficacy

The concepts of teacher efficacy and collective efficacy have their origins in self-efficacy, a component of social cognitive theory. Beliefs of self-efficacy form the basis for human behavior choices. Bandura (1997) offered the following definition of self-efficacy: “Perceived self-efficacy refers to beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (p. 3). Individuals base their actions, responses, and choices on their perceived self-efficacy. A person may attempt to predict what the behavioral outcome will be – whether he or she will succeed or fail, be liked or shunned, be accepted or rejected.

In addition to influencing the choices people make and the actions they take, self-efficacy beliefs impact how much effort individuals will put forth on a particular task, how long they will persevere when they encounter difficulties, how resilient they are in the

face of adversity, the level of stress and anxiety they feel, and the end result or accomplishment (Pajares, 1997). Individuals with a high level of self-efficacy regarding a particular task tend to tackle the situation at hand with confidence, set high aspirations, and remain committed to completing it. However, people with a poor perception of personal competence tend to avoid a task because they think it is harder than it really is, give up quickly when the task is difficult, and ultimately experience anxiety and failure.

Self-efficacy is critical to the amount of effort, persistence, and perseverance an individual is willing to expend toward a certain task or behavior (Pajares, 1996). Not all self-referent thought, however, is perceived self-efficacy. According to Bandura's (1997) social cognitive theory, self-efficacy beliefs are highly predictive of behavior, while thoughts of self-concept or self-image are not. Likewise, the concept of self-esteem or self-worth is different from self-efficacy. How highly an individual esteems or likes himself or herself does not impact that individual's judgment of his or her personal capability to accomplish a specific task. Another self-referent concept is locus of control, referring to whether personal actions affect outcomes or whether outcomes are subject to chance, luck, or more powerful others (Rotter, 1990). Self-efficacy is one's sense of capability to accomplish a task and is a strong predictor of behavior, while locus of control is not (Bandura, 1997).

Social Cognitive Theory

A key component of social cognitive theory is human agency. Individuals can and do exercise some level of control over what happens to them. While human behavior is determined by a number of interacting factors, human agency refers to an individual's

intentional choice in taking action to accomplish a particular purpose (Bandura, 1986, 1997). According to Bandura, “The power to originate actions for given purposes is the key feature of personal agency” (1997, p. 3).

Individual human agency is formed by three different sets of factors: behavior, environment, and personal factors including cognition, emotion, and biological conditions. Bandura (1997) referred to these three sets of factors as triadic reciprocal causation. Each of these three separate factors operates in a bi-directional, causal relationship with the other two. Human agency is also influenced by social systems. People are products of social systems as well as producers of the social systems in which they live.

In addition to individual or personal agency, social cognitive theory identifies two other forms of agency. Proxy agency involves an individual’s reliance on a social organization for resources, expertise, or assistance. Collective agency refers to group action or effort to accomplish what cannot be done alone (Bandura, 2002).

Sources of Self-Efficacy

As a cognitive function, self-efficacy is shaped in several ways. Bandura (1986, 1995, 1997) described four sources of information that influence self-efficacy: mastery experience, vicarious experience, social persuasion, and physiological or emotional states.

Mastery experience, the strongest of the four influences, provides individuals with authentic information as to their capability in a particular situation. As individuals interpret the effects of their actions, their interpretations help to create self-efficacy beliefs. An enactive mastery experience resulting in success builds stronger perceptions

of self-efficacy. Likewise, failures in direct experience will result in decreased self-efficacy.

Vicarious experience (i.e., observing others and modeling their behavior) also helps to form perceptions of efficacy. As one observes the purposive performance of others, especially others perceived to be significant or important, self-efficacy is influenced. When a model performs well, the efficacy expectation of the observer increases. When someone models a skill poorly, the observer's efficacy decreases. The more closely one identifies with the model, the greater will be the impact on self-efficacy (Tschannen-Moran et al., 1998).

Social persuasion is a third source of efficacy information. Verbal judgments from others, though not as strong an influence as mastery or vicarious experiences, do influence individual perceptions of efficacy (Pajares, 1997). If those persons considered significant express realistic belief in an individual's ability to accomplish a task, the individual's efficacy will be sustained or strengthened. However, it is important that the positive, verbal persuasion be truthful and not unrealistic (Bandura, 1997). Though positive persuasion or constructive criticism may encourage an individual to put forth effort to accomplish a task, negative comments, ridicule, or expressions of doubts from others quickly undermine one's perception of efficacy (Bandura, 1986). In addition to mastery experience, social persuasion can also have notable impact on self-efficacy beliefs, as seen in a case study of an elementary science teacher's induction year (Mulholland & Wallace, 2001).

Finally, individuals are influenced by their physiological and emotional states such as stress, tension, stamina, fatigue, joy, excitement, and mood. However, the

intensity of the physical and emotional reactions is not as critical as the judgment and interpretation of those reactions (Bandura, 1995). Additionally, an individual's vulnerability to physiological and affective states partly determines the affect on self-efficacy beliefs. For example, an individual may interpret sweaty palms and increased heart rate as a natural occurrence before public speaking and not be negatively impacted by it. The same physical reactions in a person who fears speaking in public may be interpreted as signs that failure is sure to follow (Goddard, 1998).

In academic settings, there are different levels of efficacy judgments. Students form a perception or belief about their ability to learn a new concept, to study a new subject, or to complete an assignment. Teachers perceive their own capacity to teach and motivate students. Their efficacy judgments are beliefs or perceptions, not necessarily correct assessments of their capability.

Teacher Efficacy

A teacher's perceived efficacy is a particular kind of self-efficacy related directly to the task of teaching. Teachers with a high level of personal teaching efficacy believe they have what it takes to get students to learn and can develop strategies to overcome obstacles that may occur in the classroom. Conversely, teachers with a low perception of teaching efficacy maintain they have little influence over their students' accomplishments because most students' motivation and achievement really depends on their home environment and background. Woolfolk defines teaching efficacy as "a teacher's belief that he or she can reach even the most difficult students and help them learn" (1998, p. 393).

Historically, the first efficacy investigation took place when researchers at the Rand Corporation developed two, five-point Likert scale items: “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” (Armor et al., 1976, p. 159) and ”If I try really hard, I can get through to even the most difficult or unmotivated students” (Armor et al., p. 160). These items were based on Rotter’s (1966) locus of control theory and were intended to measure how much teachers believed they could control student motivation and performance. Teachers with strong agreement on the first item exhibited a belief in external circumstances overpowering their ability to impact students. Teachers with strong agreement on the second item indicated a belief in their capacity to exercise control over students’ learning.

Researchers eventually shifted conceptual frameworks from Rotter’s locus of control theory to Bandura’s social cognitive learning theory (Shaughnessy, 2004). Although there has been some confusion over the two conceptual frameworks, it is important to note that Rotter’s internal locus of control and Bandura’s perceived self-efficacy are not the same construct, nor are they based on the same theoretical perspective. Bandura (1997) has elaborated on the differences. Beliefs about whether actions affect outcomes or locus of control are not the same as perceived self-efficacy or beliefs about one’s ability to produce certain actions. Additionally, efficacy is a much better predictor of behavior than locus of control.

After perceptions of teacher efficacy were shown to impact individual differences in instructional effectiveness, Gibson and Dembo (1984) researched teacher efficacy as a construct to be validated and measured. Based on the Rand Corporation items (Armor

et al., 1976), the authors developed a 30-item instrument, the Teacher Efficacy Scale, which yielded two efficacy factors: personal teaching efficacy and general teaching efficacy. After administering the Teacher Efficacy Scale to elementary teachers and observing in classrooms, their research indicated differences between high and low efficacy teachers. Teachers who rated high in perceived ability to teach children tended to spend less time in small group instruction and more time in whole class instruction, and rather than criticize students for incorrect answers to questions, they persisted in leading students to formulating correct responses.

Teacher preparation may impact educators' perception of their ability to make a difference in their classrooms. Pre-service teachers have reported an increase in teacher efficacy after their student teaching experience (Hoy, 2000; Hoy & Spero, 2005; Woolfolk, 1998). However, the length of the student teaching experience, whether one semester or two semesters, does not appear to impact perception of teacher efficacy (Chambers & Hardy, 2005). The method of teacher preparation, whether a traditional teacher education program or some kind of alternative teacher preparation, does not seem to impact teacher efficacy (Groves 1998; Guyton & Fox, 1991). Novice teachers' perception of teacher efficacy tends to decline during the first year of teaching with increasing concerns about student discipline (Hoy, 2000; Hoy & Spero, 2005; Onafowora, 2004). However, age may impact teachers' sense of efficacy during the induction year. Research has shown that older adults who begin teaching later in life experience an increase in self-efficacy during their first year as teachers (Chester & Beaudin, 1996). Life skill teacher training programs (Schechtman, Levy, & Leichtentritt,

2005) and serving as mentor teachers to new teachers (Yost, 2002) have revealed an increase in teachers' sense of efficacy.

In a study of experienced teachers, Guskey (1987) explored the affect of several context variables on perceptions of efficacy. When student performance outcomes were positive, teachers reported greater efficacy. However, when student performance was negative, teachers reported lower perceptions of efficacy and less responsibility for the outcome. Additionally, those educators perceived themselves to be more highly efficacious in terms of group results than for individual student outcomes. When educational outcomes for groups indicated failure, teachers felt responsible. However, they felt less responsible for negative outcomes for individual students, citing the environment and other factors as the cause. Other research has shown that experienced teachers reported more resources, including resources provided by the school, than novice teachers and that perception of teacher efficacy appeared to be positively impacted by resources available to teachers (Tschannen-Moran & Hoy, 2002).

Teacher efficacy has been shown to impact the implementation of educational innovations. This finding is particularly important with regard to teachers' openness to educational technologies and instructional use of computers in their classrooms (Bandura, 1997). Teachers with high self-efficacy are more likely to establish a positive learning environment and to implement innovative ideas when contrasted to teachers with low self-efficacy (Yost, 2002). Other research has confirmed that teachers with a strong sense of personal teaching efficacy are more likely to implement new instructional innovations (Ghaith & Yaghi, 1997).

Teacher efficacy has been strongly linked to teachers' commitment to teaching (Coladarci, 1992; Short, 1994). However, strong relationships between teacher efficacy and teacher empowerment, while expected because they are conceptually similar, have not been found. Teacher efficacy can be considered a dimension of teacher empowerment, along with decision-making, professional growth, status, autonomy, and impact (Short, 1994). Some researchers have theorized a strong relationship between teacher efficacy and empowerment, but have shown only a low to moderate level relationship (Edwards, Green, & Lyons, 2002). Another experimenter expected to find an increase in both teacher efficacy and empowerment by implementing a teacher peer-coaching program facilitated by a school social worker in an urban school. Even though the pre-test/post-test comparison of means showed a statistically significant difference, it was due to a decrease in the control group scores, rather than an increase in the experimental group (O'Connor & Korr, 1996). In a study examining the effects of participation in teacher research, Henson (2001a) showed growth in efficacy, but no relationship between teacher efficacy and empowerment.

There is some evidence that supervision and teacher morale impact efficacy beliefs among teachers. Although one might expect that first year teachers dealing with difficulties in an urban school would question their ability to make a difference in the lives of their students, novice teachers who reported support from administration in terms of being observed several times by their supervisor showed an increase in self-efficacy (Chester & Beaudin, 1996). The relationship between supervision and teacher efficacy was also shown in a study of experienced teachers. When a school principal was actively involved in formative teacher evaluation, and when teachers perceived that

the principal valued good teaching, teachers expressed more confidence in the principal and higher teacher efficacy (Ebmeier, 2003). In other studies, teachers' efficacy beliefs were stronger when they experienced high degrees of collaboration with peers (Chester & Beaudin, 1996), when other teachers and administrators had high expectations for student achievement (Woolfolk, 1998), and when faculty morale was high (Hoy & Woolfolk, 1993).

Collective Efficacy

Some researchers have suggested looking at teacher efficacy as it relates to the classroom context and as it relates to the organizational conceptualization of a school (Friedman & Kass, 2002). Some have explored teachers' efficacy beliefs as determinants of attitudes toward the school as an organization, especially in terms of commitment to the school and job satisfaction (Caprara, Barbaranelli, Borgogni, & Petitta, 2003). Others have suggested investigating the possible interrelationships between teacher efficacy and collective efficacy (Henson, 2002; Pajares, 1997; Tschannen-Moran et al., 1998,). Research has shown that a teacher's perception of self-efficacy influences the achievement of that teacher's students; at the school level, the collective perception of teachers in the building also influences how well all the students in that particular school perform (Bandura, 1993, 1997).

According to Bandura's (2000, 2002) conceptualization of social cognitive theory, there are three different forms of human agency – personal, proxy, and collective. Although personal efficacy is the foundation of human agency, individuals do not always control the environments that shape their lives. An individual's influence on self and environment are sometimes limited. Proxy agency refers to the process of seeking

assistance from others or from social institutions. Individuals at some time must rely on a social organization for expertise, resources, or assistance. The third type of agency results from individuals organizing themselves into some type of group or collective to accomplish a goal interdependently – a goal that cannot be accomplished alone. Such collective agency results from group members' shared beliefs in the group's ability to accomplish a desired goal.

Socioeconomic status has been shown to contribute to perceived self-efficacy in managing daily living and to self-efficacy to improve society; both of these forms of efficacy further contribute to perceived collective efficacy to bring about social change (Fernández-Ballesteros, Díez-Nicolás, Caprara, Barbaranelli, & Bandura, 2002). Research of a variety of group settings, including businesses, athletic teams, military combat teams, urban neighborhoods, and educational institutions, indicates that groups with higher levels of perceived collective efficacy exhibit stronger motivation in accomplishing agreed upon tasks and more resiliency in the midst of difficulties. Overall, those groups perform collectively to greater accomplishments than groups with lower levels of collective efficacy (Bandura, 2000). Group strength partly depends upon people's sense of collective efficacy in solving problems and improving conditions. Perceived collective efficacy affects group choices, effort, and resiliency amidst difficulties (Bandura, 1986).

Based on social cognitive theory, Bandura (1986, 1995, 1997) expanded the construct of self-efficacy to the larger, social construct of collective efficacy within group settings. Since schools are group settings in which teachers work together to accomplish established goals in educating children, collective efficacy may be studied

within that educational environment. Teachers do not practice the art of teaching as isolates, but rather as an interactive team or social collective striving to achieve similar goals with their students. Pajares (1997) credits Bandura for extending the concept of self-efficacy to the group construct of collective efficacy. Researchers indicate the need to look beyond self-efficacy to the impact of collective efficacy and to the possible interrelationships between the two concepts (Henson, 2002; Pajares, 1997; Tschannen-Moran et al., 1998).

Just as researchers have shown the positive impact of teacher self-efficacy on student achievement, researchers have also shown the positive impact of collective teacher efficacy on student achievement within a school (Bandura, 1995, 1997; Barr, 2002; Goddard, 1998, 2001; Goddard, Hoy, & Hoy, 2000; Hoy, Smith, & Sweetland, 2002b). When the collective efficacy of teachers within a school is high, those teachers tend to create mastery experiences for students and establish instructional environments conducive to learning. The end result is higher standardized measures of student achievement, regardless of socioeconomic status, race, or ethnicity of students (Bandura, 1995). Researchers have shown perceived collective efficacy of teachers within a school to be related to academic press (Hoy, Smith, & Sweetland, 2002a), to organizational effectiveness (Olivier, 2001), and teacher influence over school decisions (Goddard, 2002a; Goddard, Hoy, & Hoy, 2004). Regarding the possible relationship of a school principal's influence on the perceived collective efficacy of teachers within the school, one study has shown that a principal's transformational leadership does not influence teachers' collective efficacy (Nicholson, 2003), while another study has shown

that teachers' collective efficacy is related to supportive principal behaviors (Knobloch & Whittington, 2002).

Demographic Characteristics

A review of the literature on teacher efficacy and collective efficacy reveals that most researchers guarantee anonymity to teachers completing efficacy surveys; therefore, demographic information is often omitted. Goddard (2001) recommended the inclusion of teacher demographic data to determine the possibility of relative effects on teacher efficacy and collective efficacy.

Ross, Cousins, and Gadalla (1996) explored the task specificity of teacher efficacy for experienced secondary teachers. They found that those teachers' perceptions of efficacy differed when teaching different classes, indicating that the context of the task of teaching is important. Even though they collected demographic data of each teacher's background, including years of teaching experience, gender, formal education, and subject area, they were not included in the statistical analysis. Other researchers noted that efficacy beliefs of novice teachers were more easily impacted in a positive direction than efficacy beliefs of experienced teachers (Tschannen-Moran et al., 1998).

Teacher characteristics of experience, grade level taught, and gender were found to be related to teacher concerns about teaching, including self-survival, task concerns, and student impact concerns (Ghaith & Shaaban, 1999). A teacher's educational level was shown to predict teacher self-efficacy; teachers with graduate degrees were more likely to have higher perceptions of teaching efficacy (Hoy & Woolfolk, 1993). However, the teacher characteristics of age, gender, and years of teaching experience did not

impact perceptions of efficacy in a statistically significant way. Kurz (2001) found that female secondary teachers reported a higher perception of teacher efficacy than did their male counterparts. Still other researchers concluded that preschool and elementary teachers believed more strongly that positive student outcomes were a result of their actions than secondary teachers did, and that teachers with more years of teaching experience maintained higher perceptions of personal teaching efficacy (Soodak & Podell, 1996).

In terms of teacher characteristics and their impact on collective teacher efficacy, Kitchens (2000) found a statistically significant relationship between teachers participating in common planning time and their perception of higher collective efficacy, but with minimal effect size. Kurz (2001) reported no statistically significant relationships between teacher demographic variables and perceptions of collective teacher efficacy.

Teacher Efficacy and Collective Efficacy Links

Both individual teacher perceptions of self-efficacy and group perceptions of collective efficacy within a school have been shown to impact student achievement. Scholars have recommended the study of possible interrelationships between teacher efficacy and collective efficacy (Henson, 2001b, 2002; Pajares, 1997; Tschannen-Moran et al., 1998). Some research has been conducted to determine possible links between the two constructs of efficacy in the field of education.

Mackenzie (2001) found a moderate correlation between high school teacher perceptions of individual efficacy and collective efficacy. Other researchers found perceptions of collective efficacy to be the strongest predictor of the variance in teacher efficacy between elementary schools in an urban area (Goddard, 2003; Goddard &

Goddard, 2001; Goddard et al., 2004). Similar results were obtained in a study conducted in junior high schools in Italy, with teacher efficacy explaining 62% of the variance in collective efficacy (Caprara et al., 2003).

Although efficacy scholars have recommended research on the possible interrelationships between teacher efficacy and collective efficacy and even though some studies have indicated an association between the two constructs, research as to the impact of teacher demographics and school characteristics is limited. Some researchers guarantee anonymity to teachers in survey data collection about perceptions of efficacy, which may account for the lack of research of the possible interrelationships. Goddard recommended future research to examine the relative effects of teacher demographic variables on individual teacher efficacy and collective efficacy at the school level (2001).

Much research has linked teacher efficacy and collective efficacy to student achievement, and yet “an important but overlooked question concerns the nested association between these two influential types of beliefs” (Goddard, 2003, p. 189). Goddard tested the relationship between teacher efficacy and collective efficacy using a sample of 438 teachers in 47 schools in a Midwest urban school district. A five-item personal teacher efficacy scale based on Gibson and Dembo’s (1984) survey was used to measure teacher efficacy. A 21-item collective efficacy scale (Goddard et al., 2000) was used to measure teachers’ perceptions of collective efficacy. The teachers tended to have a higher perception of efficacy for themselves individually than for their respective faculty as a whole. Correlational analysis, conducted at two levels, showed a Pearson *r* of .42 for teacher level perceptions of teacher efficacy and collective efficacy,

and .51 for school level (aggregated) perceptions of teacher efficacy and collective efficacy. The strength of the relationship between the two variables was moderate and Goddard (2003) concluded that the two efficacy constructs were related but unique. In two one-way ANOVAs, intraclass correlation coefficients showed only 14% variation in teacher efficacy between schools, but a much larger 45% variation in collective efficacy between schools. In further multilevel analyses, school size and student minority population were not statistically significant predictors of variation among schools in teacher efficacy. However, of the three predictors that were statistically significant, collective efficacy was the strongest predictor of variation among schools in teacher efficacy. Combining student socioeconomic status and past mathematics achievement scores explained 24.7% of the variance; collective efficacy explained 73.5% of the variance among schools in teacher efficacy. Goddard (2003) claimed, “Knowledge about collective efficacy is, therefore, critical to understanding the influence of schools on teachers’ professional work and, in turn, student achievement” (p. 185).

Private School Research

The United States Department of Education National Center for Education Statistics (NCES), citing increasing concern for educational alternatives leading to an increased need for data on private schools, has made it a priority to collect information on private elementary and secondary schools. Beginning in the 1989-1990 school year, the NCES conducted the first Private School Survey and has continued to collect information every two years (National Center for Education Statistics, n.d.).

More than 27,000 schools, or 23%, of all schools in the United States, are private schools. More than 6,000,000 students, or 11.6% of all elementary and secondary

students in the United States, attend private schools (Council for American Private Education, 2003; NCES, 2004). In terms of secondary schools, at least one out of every four is a private school; therefore, private schooling is a substantial organizational factor in the American educational system (Baker, Han, & Keil, 1996). Even though elementary schools make up the largest percentages of public and private schools, only 4% of public schools are combined kindergarten or first grade through twelfth grade schools compared to a much larger proportion (30%) of private schools. In terms of location, about 42% of private schools are located in central cities and about 40% are located in suburban areas or large towns (Alt & Peter, 2002).

Nonpublic schools have been divided into seven categories: Catholic schools, including parochial, diocesan, and private order; other religious schools, including conservative Christian, schools affiliated with a religious body, or unaffiliated; and nonsectarian. Although Catholic schools maintain the largest enrollment nationwide, their student population is decreasing. Since 1989, the largest increase in percentage of students enrolled has occurred in conservative Christian schools. This remarkable increase of 46% more students from 1989 to 2004 is noteworthy (Livingston & Wirt, 2005). It is this category of private school that has been selected for the current study of teacher efficacy and collective teacher efficacy.

Private schools are owned and governed by religious bodies or boards of trustees that are independent from local, state, and federal governments. Private school funding is largely from nonpublic sources including tuition income, private foundations, religious bodies, alumni, and donations from individuals (Alt & Peter, 2002). A review of the literature has shown that most teacher efficacy research has been conducted in

public schools. Very few research studies of teacher efficacy in private schools have been found. The only research located to date was a qualitative study of professional communities in three privatized elementary schools. The organizational culture, faculty collaboration, and autonomy in those schools were viewed as important in strengthening teacher commitment and efficacy (Madsen, 1996). Data for Madsen's (1996) study were obtained from observing in classrooms, attending faculty meetings, and interviewing teachers in three different schools throughout a school year. Formal interviews with twenty-eight teachers revealed the importance of the school principal's leadership, the involvement of parents, and the commitment of teachers to student achievement. The principals as the academic leaders of their schools were described as supporting teacher innovations, encouraging academic excellence, and building collaborative school environments with an emphasis on student learning. Positive parent involvement without overreaction to parental concerns led to harmonious relationships between teachers and parents at the three schools. Finally, the commitment of the teachers to the mission of their schools and to collaborative discussions about teaching led to the enhancement of student learning.

Summary

The intent of this chapter was to provide a historical review of the beginnings of self-efficacy as a component of social cognitive theory. The sources of self-efficacy were described as well as the current research on efficacy within the educational environment, including both individual teacher efficacy and collective teacher efficacy. Much research has linked both teacher efficacy and collective teacher efficacy to improved student achievement, but the question remains concerning the relationship

between the two efficacy constructs. This study was one attempt to explain the relationship between teacher efficacy and collective teacher efficacy. Additionally, the need for inclusion of teacher demographic characteristics in efficacy research was documented and this study was designed to address that need. Finally, the lack of research in the private school setting was examined. This particular research was devoted to the exploration of the perceptions of teachers employed in conservative Christian schools located in similar suburban locations. Findings of this study added to the body of knowledge of the relationships between teacher efficacy and collective efficacy, relationships between efficacy constructs and teacher demographic variables, and the impact of efficacy constructs within conservative Christian school environments.

CHAPTER 3

DESIGN OF THE STUDY

Introduction

This chapter includes the methodology to be used in this study. A correlational analysis with teacher data collected through researcher-administered surveys will be conducted to explore the interrelationships between teachers' perceptions of individual teacher efficacy, collective teacher efficacy, and various demographic characteristics, including age, gender, ethnicity, school campus, number of years teaching, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught. This chapter will also include a description of the schools in which the research will be conducted, the participants who will provide their perceptions of teacher efficacy, and the data collection procedures. Finally, the data analysis procedures will be discussed.

School Settings

The purpose of this study is to explore the relationship between kindergarten through twelfth grade teachers' perceptions of individual teacher efficacy and collective efficacy within a suburban private school setting. In addition, the relationship between selected teacher demographic characteristics and both teacher efficacy and collective teacher efficacy will be examined. Because independent schools are often smaller than public schools in terms of student population and number of teachers, several independent schools, similar in nature, were selected for this study. The private schools are in close geographic proximity to the others within the north central Texas area. The

selected schools are similar in terms of accreditation status, with each school having obtained accreditation from the Southern Association of Colleges and Schools. Additionally, the selected schools are similar in mission and doctrinal beliefs, as evidenced by membership in the Association of Christian Schools International.

Participants

Teachers from three of the larger suburban schools in the north Texas area were selected for this study. In addition to size, the schools were chosen by geographic location. The three schools are within a four-mile radius of each other, serve similar student bodies, and have teachers representing similar socioeconomic status groups. All three schools are considered unit schools with grades kindergarten through twelve housed in one facility, rather than on separate elementary and secondary campuses. Co-educational college-preparatory day schools, they offer academic programs with Advanced Placement courses in addition to fine arts and athletics. Student bodies in the three schools range from 530 to 1500 students. Tuition charges range from $6,200 for kindergarten students to $13,000 for twelfth graders. High school graduation requirements meet or exceed the Texas Education Agency requirements mandated by the state.

The smallest acceptable sample for a correlational study is 30 participants, based on an acceptable sampling method (Gay, 2000). Although the convenience sample in this study was not random, the expected sample size of 200 teachers exceeded the generally recommended minimum of 10 subjects per variable in regression analyses (Pedhazur, 1997). With twelve teacher demographic variables and two scores of teacher efficacy, a minimum of 140 teachers would meet the

recommended number of subjects for this sample. With a total of 257 teachers in the three schools, an expectation of 200 complete surveys was considered reasonable. A total of 216 complete surveys were obtained for this study.

Teacher demographic information was obtained and aggregated to prevent individuals from being identified. Of the 216 participants, 213 of the teachers reported their age ranging from 25 to 70 years of age. Teachers' years of experience ranged from 1 to 38, and their years at the current school ranged from 1 to 29. Table 1 contains these three continuous variables with mean and standard deviation.

Table 1

Participant Demographics (Continuous Data)

Variable	*N*	Mean	Standard Deviation
Age	213	44.83	10.88
Years teaching	214	14.08	8.91
Years at current school	214	7.08	5.94

Other teacher demographic information was reported. A majority of the participants were female (nearly 82%). A vast majority, nearly 95%, identified their ethnicity as Caucasian. Nearly 60% of the teachers had received their bachelor degrees, about 37% had earned graduate degrees, and about 3 percent reported only an associate degree. More than 90% of the participants reported they held a teaching certificate. A majority of the teachers were state certified, or were certified by both the

state and by the Association of Christian Schools International (ACSI). Almost 11% were certified through the Association of Christian Schools International only. Certification grade levels, certification subject areas, grade level taught, and subject area taught, as well as the frequencies and percentages of all categorical variables are listed in Table 2.

Table 2

Participant Demographics (Categorical Data)

Variable	*N*	%
Gender		
Male	39	18.2
Female	175	81.8
Ethnicity		
Caucasian	203	94.9
African-American	4	1.9
Asian/Pacific Islander	1	.5
Hispanic	5	2.3
American Indian/Alaskan Native	1	.5
Highest Degree		
Associate	7	3.3
Bachelors	127	59.9
Masters	73	34.4
Doctorate	5	2.4
Teacher Certification		
State	165	77.5
ACSI	23	10.8
Other	5	2.3
None	20	9.4
Certification Grade Level		
Elementary	72	33.8
Middle School/Secondary	82	38.5
K-12/All level	41	19.2

(table continues)

Table 2 *(continued)*

Variable	*N*	%
Certification Subject Area		
Science	16	7.6
Social Studies	19	9.0
Math	16	7.6
English/Language Arts/Reading	35	16.6
Fine Arts	22	10.4
Interdisciplinary/Generalist	50	23.7
Other	36	17.1
Grade Level Taught		
Elementary	86	40.0
Middle School/Secondary	112	52.1
K-12/All level	15	7.0
Subject Area Taught		
Science	19	9.0
Social Studies	19	9.0
Math	19	9.0
English/Language Arts/Reading	28	13.2
Fine Arts	23	10.8
Interdisciplinary/Generalist	61	28.8
Other	43	20.3
School		
School A	87	40.3
School B	87	40.3
School C	42	19.4

Instruments

This study was conducted utilizing three survey instruments: the Teachers' Sense of Efficacy Scale – Short Form (Tschannen-Moran & Hoy, 2001), the Collective Efficacy Scale (Goddard, 2002b), and a demographic survey of teacher characteristics. The two efficacy scales are recent measurement tools that have been developed in response to persistent measurement problems associated with earlier instruments

(Bandura, 1993, 1995, 1997; Brouwers, 2003; Goddard, 2001, 2002b; Goddard et al., 2004; Tschannen-Moran & Hoy, 2001; Tschannen-Moran et al., 1998). The instruments are copyrighted by the authors, but there are no restrictions for use of the instruments in scholarly research or non-profit educational purposes.

The Teachers' Sense of Efficacy Scale, formerly called the Ohio State Teacher Efficacy Scale because it was initiated at the Ohio State University, was developed by Tschannen-Moran and Hoy (2001) in an effort to provide a tool with stronger reliability and validity. The result was both a long form of 24 items and a short form of 12 items. A study of both the long and short form of the scale administered to practicing teachers with principal-axis factoring and varimax rotation revealed three factors with eigenvalues greater than one. Factor 1, efficacy for instructional strategies, included 8 questions in the long form and 4 questions in the short form, such as "To what extent can you provide an alternative explanation or example when students are confused?" The factor loadings ranged from .63 to .75 for factor 1. Factor 2, efficacy for classroom management, included 8 questions in the long form and 4 questions in the short form, such as "How much can you do to control disruptive behavior in the classroom?" The factor loadings ranged from .61 to .83 for the second factor. Factor 3, efficacy for student engagement, included the same number of questions, such as "How much can you do to get students to believe they can do well in schoolwork?" with factor loadings ranging from .62 to .75. In the long form, these three factors accounted for 54% of the variance for in-service teachers; in the short form, the variance was 65%. For each item asking how much they could do or to what extent they could accomplish something, teachers responded using a 9-point Likert scale ranging from 1 (indicating "nothing") to

9 (representing “a great deal”). The reliability of scores reported for the short form was .90, and strong intercorrelations between the long and short forms ranging from .95 to .98 for the total score and three subscale scores were found. Construct validity between the two scales was shown to be high (r = .79 to r = .89, p < .01) as well as comparisons to other efficacy measures. Tschannen-Moran and Hoy (2001) concluded that the scales “could be considered reasonably valid and reliable” and that the brevity of the scales “should prove to be a useful tool for researchers interested in exploring the construct of teacher efficacy” (p. 801). Furthermore, the authors recommended the long form for preservice teachers and the short form for practicing teachers.

The Collective Efficacy Scale (Goddard, 2002b), consisting of 12 items, was developed from a longer 21-item scale (Goddard et al., 2000) to measure more accurately and concisely the construct of collective efficacy by balancing group competence and task analysis questions. Simply aggregating individual teacher’s scores on teacher efficacy scales to the school level is not an accurate measure of the collective efficacy construct (Goddard, 1998; Henson, 2002). Though teacher efficacy scale items are worded from the individual’s perspective (“I can do a great deal to control disruptive behavior in the classroom”), collective efficacy scale items must be worded from the group orientation (“Teachers in this school are able to get through to the most difficult students”) and be answered in terms referring to teachers within a particular school rather than teachers in general.

Goddard’s (2002b) empirically developed Collective Efficacy Scale short form was a statistically significant predictor of between-school differences in student mathematics achievement, just as the original 21-item scale was a statistically

significant predictor. Teachers responded to a survey of 12 questions using a 6-point Likert scale ranging from 1 (indicating “disagree”) to 6 (representing “strongly agree”). A study of both the long and short form of the Collective Efficacy Scale administered to practicing teachers with principal-axis factoring revealed a single factor, with eigenvalues of 7.69 for the short form and 7.53 for the long form. This single factor accounted for 64% of the variance in the short form and 58% in the long form. Scores on the short form showed high internal reliability, with an alpha equal to .94, compared to .96 on the original form. Scores from both scales were highly correlated (r = .983, alpha level not stated), indicating high criterion-related validity.

In addition to the Teachers’ Sense of Efficacy Scale – Short Form (Tschannen-Moran & Hoy, 2001) and the Collective Efficacy Scale (Goddard, 2002b), I developed a demographic survey of teacher characteristics to be used in the present study. The purpose of gathering this information and including it in the statistical analysis was to determine the possibility of relative effects on teacher efficacy and collective teacher efficacy. The survey was field tested among practicing teachers to ensure that the questions were clear and to estimate the amount of time necessary to complete the survey. On the survey, participants were asked to report their age, gender, ethnicity, number of years teaching, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught. This demographic survey contained eleven questions and was entitled “Teacher Demographic Characteristics” (see Appendix A). The particular school campus, marked as “School A,” “School B,” or “School C” was indicated on the demographic survey after collection from the schools.

Procedures

This study was conducted utilizing three survey instruments: the Teachers' Sense of Efficacy Scale – Short Form (Tschannen-Moran & Hoy, 2001), the Collective Efficacy Scale (Goddard, 2002b), and a demographic survey of teacher characteristics (i.e. age, gender, ethnicity, school, number of years teaching, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught). These instruments were distributed and collected by school principals at regularly scheduled faculty meetings at the respective schools during the months of February and March of 2006. Although I personally intended to administer the surveys, in two schools the headmasters requested the surveys be administered at the same time in three different faculty meetings by the respective principals. Therefore, it seemed prudent to request principals in the third school to administer the surveys. The principals in all three schools prompted participants using the same scripted directions (see Appendix B).

Data Analysis

Correlational research is used to determine whether relationships exist between quantifiable variables and to what degree. After collecting data, statistical analyses are conducted to determine the correlation coefficient or degree of relationship between two or more variables. Correlational studies do not indicate causal relationships, but the higher the correlation coefficient, the higher the relationship between the variables (Gay, 2000). In addition to the degree of the relationship, the nature of the relationship (whether positive or negative) is determined in correlational analysis (Pedhazur, 1997).

The product moment correlation coefficient, or Pearson *r*, is the most commonly used measure, the most precise estimate of correlation, and the appropriate method when both variables are expressed as continuous data (Gay, 2000). In the present study, the correlation analysis between the teacher efficacy score and the collective efficacy score, both of which are expressed as continuous, interval scores, were determined using the Pearson *r*.

Although correlational studies make no distinction between independent variables and a dependent variable, multiple regression analysis research seeks to explain variability in the dependent variable resulting from the independent variables being examined (Pedhazur, 1997). Multiple regression research is versatile in its capability of using data with any scale of measurement and is precise in that multiple variables may predict more accurately than a single variable. In addition, multiple regression analysis may be used to further analyze correlational studies (Gay, 2000). In the present study, multiple regression analyses were conducted to determine whether perceptions of collective efficacy and teacher demographic characteristics explained any variability in teacher efficacy and whether perceptions of teacher efficacy and teacher demographic characteristics explained any variability in collective efficacy.

A series of statistical analyses were conducted to analyze the data in this study. Descriptive statistics, including means, standard deviations, and ranges, were calculated for teacher efficacy and collective efficacy. A correlational analysis, using the Pearson product moment correlation was performed to examine the relationships between teacher efficacy and collective efficacy. Two multiple regression analyses were also conducted to determine the degree to which variables were related. The first

multiple regression analysis involved teacher efficacy as the dependent variable and independent variables of collective efficacy and the various teacher demographic characteristics, (i.e. age, gender, ethnicity, school, number of years teaching, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught). The second multiple regression analysis used collective efficacy as the dependent variable and the independent variables of teacher efficacy and the teacher characteristics (i.e. age, gender, ethnicity, school, number of years teaching, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught). An alpha level of .05 was used for all inferential statistical tests. All teacher demographic characteristics of the sample are listed in Tables 1 and 2.

It was necessary to transform some of the categorical demographic data using dummy coding. All participant reports of non-Caucasian ethnicity were combined into one non-Caucasian variable. Teacher certification other than state certification was listed together as other certification. For highest degree obtained, masters and doctorates were combined into graduate degrees. For both certification subject area and subject area taught, science and math were combined into a “technical” category, social studies, English/language arts/reading, and interdisciplinary/generalist were combined into the “interdisciplinary” category, and all others including fine arts were relabeled as “other.” The recoded variables can be seen in Table 3.

Table 3

Combined and Recoded Participant Demographics

Variable	*N*	%
Ethnicity		
Caucasian	203	94.9
Other	11	5.1
Highest Degree		
Graduate	78	36.8
Other	134	63.2
Certification		
State	165	77.5
Other	48	22.5
Certification Subject Area		
Technical	32	15.2
Interdisciplinary	104	49.3
Other	75	31.1
Subject Area Taught		
Technical	38	17.9
Interdisciplinary	108	51.0
Other	66	31.1

Although the sample was not random, the sample size of 216 teachers exceeded the generally recommended minimum of 10 to 15 subjects per variable in regression analyses. Knowing that small and non-meaningful effects can be statistically significant with a sufficiently large sample, the results of these regression analyses were reviewed within the context of sample size (Pedhazur, 1997).

Summary

This chapter provided the design of this correlational study, which explored the interrelationships between teachers' perceptions of individual teacher efficacy, collective teacher efficacy, and various demographic characteristics (i.e. age, gender, ethnicity, school, number of years teaching, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught). This chapter also included a description of the schools in which the research was conducted, the participants who provided their perceptions of teacher efficacy, the survey instruments, and the data collection procedures employed. Finally, the data analysis procedures and the research questions were discussed.

CHAPTER 4

PRESENTATION OF DATA

Introduction

This chapter provides a summary of the data collected from 216 teachers in conservative Christian schools in north Texas, including statistical interpretation of the data using descriptive statistics and correlational and multiple regression analyses. A factor analysis of the Teachers' Sense of Efficacy Scale (Tschannen-Moran & Hoy, 2001) is presented. Specifically, descriptive statistics of teacher efficacy and collective efficacy scores are noted as well as the internal reliability of scores for both scales. The correlational analysis between teacher efficacy and collective efficacy is described. Finally, the results of the multiple regression analyses using both teacher efficacy and collective efficacy as dependent variables are reported.

Factor Analysis

The developers of the Teachers' Sense of Efficacy Scale (Tschannen-Moran and Hoy, 2001) strongly recommend that researchers conduct a factor analysis to determine how participants in a particular study respond to the survey questions. Factor analysis, a frequently used technique in multivariate research, provides an empirical basis for sorting a large number of variables into smaller clusters of related variables that are moderately or highly correlated with each other. These smaller clusters or sets of variables are referred to as factors or latent variables (Gall, Borg, & Gall, 1996).

In the present study, the principal-axis factoring and varimax rotation revealed the same three factors with eigenvalues greater than one, just as was found by Tschannen-Moran and Hoy (2001). This factor analysis and structure matrix is displayed in Table 4. The first cluster of variables that are the most intercorrelated is the first factor. In the factor analysis in this study, the first factor is made up of Items 1, 6, 7, and 8, and is described as items that identify teachers' perceptions of their individual efficacy in classroom management. The second factor, and second-most intercorrelated set of variables, consisting of Items 2, 3, 4, and 11, describes teachers' perceptions of their individual efficacy in student management. The third and cluster of variables in the factor analysis is made up of Items 5, 9, 10, and 12, which describe teachers' perceptions of their individual efficacy in instructional strategies.

Table 4

Teachers' Sense of Efficacy Scale Factor Pattern and Structure Matrix

Variable	I	II	III	h^2
Item 1	.814*	.092	.118	66%
Item 2	.277	.772*	.115	60%
Item 3	.069	.849*	.190	72%
Item 4	.146	.797*	.139	64%
Item 5	.203	.068	.594*	35%
Item 6	.801*	.148	.155	64%
Item 7	.848*	.167	.052	72%
Item 8	.753*	.198	.286	57%
Item 9	.066	.146	.810*	66%
Item 10	.173	.102	.661*	44%
Item 11	.164	.536*	.448	29%
Item 12	.045	.309	.784*	61%
Trace	2.798	2.470	2.453	
Cumulative % of Variance	23.318	43.902	64.343	

Notes. *Pattern coefficients > .536. I = Efficacy in Classroom Management, II = Efficacy in Student Management, III = Efficacy in Instructional Strategies, h^2 = Communality Coefficient. Percent variance is post-rotation. The fourth, unretained, prerotational eigenvalue was .803.

Descriptive Statistics

Study participants responded to the 12 items of the Teachers' Sense of Efficacy Scale (Tschannen-Moran & Hoy, 2001) using a 9-point Likert scale ranging from 1 (indicating "nothing") to 9 (representing a "great deal"). The actual responses ranged from 2 to 9 as shown in Table 5, along with means and standard deviations for each item and the total scale. The highest mean for any one item was 7.68 for Item 10, "To what extent can you provide an alternative explanation or example when students are confused?" The lowest mean was 6.31 for Item 2, "How much can you do to motivate students who show low interest in school work?" Each teacher's responses to the teacher efficacy questions were averaged to formulate the teacher efficacy score used in the correlational analysis. The mean teacher efficacy score was 7.18, with a range from 4.83 to 9.00. The 9-point Likert scale by the authors of the Teachers' Sense of Efficacy Scale indicated a response of 7 to mean that teachers can do "quite a bit" in a particular situation (Tschannen-Moran & Hoy, 2001). The mean score of 7.18 demonstrates that the teachers in this study perceived themselves to be very efficacious in terms of their teaching duties. The highest means (7.51 to 7.68), scored on Items 1, 5, 6, 8, and 10, would indicate that these teachers believed they were very capable of providing additional instruction to students when needed, controlling disruptive behavior in the classroom, establishing a classroom management system, motivating students to follow classroom rules, and designing good questions for students. The lowest means (6.31 to 6.78), scored on Items 2, 4, 11, and 12, would indicate that these teachers considered themselves less capable of motivating students with little interest in school, assisting families to help their children do well in school, employing alternative

strategies in instruction, and influencing students to value learning. Although teachers scored lower on these items, the mean for each item was still above the midpoint of 5 on the Likert scale, indicating that these teachers believe they have “some influence” in these areas (Tschannen-Moran & Hoy, 2001).

Table 5

Item Statistics for the Teachers' Sense of Efficacy Scale

Item No.	Minimum	Maximum	*M*	*SD*
Item 1	5.00	9.00	7.66	1.21
Item 2	3.00	9.00	6.31	1.38
Item 3	4.00	9.00	6.98	1.23
Item 4	3.00	9.00	6.78	1.32
Item 5	3.00	9.00	7.51	1.15
Item 6	4.00	9.00	7.53	1.13
Item 7	4.00	9.00	7.31	1.15
Item 8	4.00	9.00	7.59	1.10
Item 9	3.00	9.00	7.07	1.44
Item 10	5.00	9.00	7.68	1.02
Item 11	2.00	9.00	6.69	1.44
Item 12	3.00	9.00	6.70	1.33
Scale	4.83	9.00	7.18	.77

Note. Items were scored on a 9-point Likert scale.

Teachers participating in the study responded to the 12 items of the Collective Efficacy Scale (Goddard, 2002b) using a 6-point Likert scale ranging from 1 (indicating "disagree") to 6 (representing "strongly agree"). The teachers' actual responses ranged from 1 to 6 as shown in Table 6, along with means and standard deviations for each item and for the total scale. The lowest mean was 3.98 for Item 7, "Home life provides so many advantages that students here are bound to learn." The highest mean was 5.91 for Item 11, a reverse-score item stating, "Learning is more difficult at this school because students are worried about their safety." Each participant's responses to the collective efficacy questions were averaged to determine the collective efficacy score used in statistical analyses. The mean collective efficacy score was 4.82, with a range from 3.25 to 6.00. This mean score of 4.82 indicates that teachers' perceived the faculties of their schools were high in terms of collective efficacy. Specifically, according to the highest means (5.09 to 5.91) on Items 3, 4, 5, 11, and 12, teachers in this study expressed that learning was easier for students because: they felt safe; substance abuse did not negatively impact student learning; fellow teachers had the necessary skills to positively influence student learning; peers believed that every child was capable of learning; and teachers put forth effort to ensure that every child learned. Items 1, 6, and 7, with the lowest means ranging from 3.98 to 4.25, demonstrated that teachers were not convinced that students' home lives would positively impact their achievement, that students did not necessarily come to school ready to learn, and that all teachers in the school were not equipped to reach the most difficult students. It is important to note that even these lowest means were still above midpoint in the scale.

Table 6

Item Statistics for Teachers' Perceptions on the Collective Efficacy Scale

Item No.	Minimum	Maximum	*M*	*SD*
Item 1	2.00	6.99	4.25	.95
Item 2	3.00	6.00	4.76	.73
Item 3*	2.00	6.00	5.09	1.06
Item 4*	1.00	6.00	5.29	1.06
Item 5	1.00	6.00	5.18	.96
Item 6	1.00	6.00	4.08	1.01
Item 7	1.00	6.00	3.98	1.19
Item 8*	1.00	6.00	4.48	1.24
Item 9*	1.00	6.00	4.91	1.13
Item 10	1.00	6.00	4.53	1.06
Item 11*	1.00	6.00	5.91	.49
Item 12*	2.00	6.00	5.44	.90
Scale	3.25	6.00	4.82	.56

Notes. Items were scored on a 6-point Likert scale. *Items were reverse-scored.

In addition to the teachers' responses to the surveys, responses from the school principals to the Collective Efficacy Scale (Goddard, 2002b) were solicited. Two of the three schools are organized with three departments including lower school, middle

school, and upper school. The remaining school was organized with only two departments – elementary and secondary. Eight principals serve at the three schools, and the mean score on the Collective Efficacy Scale was 5.09, with a low score of 4.00 and high score of 5.67 as shown in Table 7. Principals' responses on the 12 items ranged from 2 to 6. The lowest and highest scored items, ranked by mean, were the same as the faculty results. The lowest average was 4.13 for Item 7, which stated, "Home life provides so many advantages that students here are bound to learn" and the highest mean was 5.88 for Item 11, a reverse-score item stating, "Learning is more difficult at this school because students are worried about their safety" (Tschannen-Moran & Hoy, 2001).

The principals' averages on perceived collective teacher efficacy exceeded the teachers' perceptions for the total score and nine individual items (1, 3, 4, 5, 6, 7, 8, 10, and 12). However, on three items (2, 9, and 11), the principals' scores were lower than the teachers' scores (see Table 8). Specifically, both principals' (5.88) and teachers' (5.91) highest scores were for Item 11, a reverse-score item which stated, "Learning is more difficult at this school because students are worried about their safety." The principals' slightly lower score might indicate their perception of some personal safety issues for students of which teachers were not aware. The principals' score of 4.75 was just slightly lower than the teachers' score of 4.76 on Item 2, which stated, "Teachers here are confident they will be able to motivate their students." Principals appeared to have a slightly lower perception of teachers' ability to motivate students. Similarly, the principals' score of 4.75 was slightly lower than the teachers' score of 4.91 for Item 9, which stated, "Teachers in this school do not have the skills to deal with student

disciplinary problems." Since principals would be more knowledgeable of disciplinary situations within their schools, they might perceive teachers to be less capable of dealing with student behavior issues than the teachers themselves.

Table 7

Item Statistics for Principals' Perceptions on the Collective Efficacy Scale

Item No.	Minimum	Maximum	*M*	*SD*
Item 1	4.00	6.00	4.88	.64
Item 2	3.00	6.00	4.75	.89
Item 3*	3.00	6.00	5.25	1.04
Item 4*	4.00	6.00	5.38	.92
Item 5	4.00	6.00	5.50	.76
Item 6	4.00	6.00	4.63	.74
Item 7	2.00	6.00	4.13	1.25
Item 8*	3.00	6.00	5.25	1.04
Item 9*	2.00	6.00	4.75	1.39
Item 10	4.00	6.00	5.00	.76
Item 11*	5.00	6.00	5.88	.35
Item 12*	5.00	6.00	5.75	.46
Scale	4.00	5.67	5.09	.55

Notes. Items were scored on a 6-point Likert scale. *Items were reverse-scored.

Table 8

Comparison of Teachers' and Principals' Perceptions on the Collective Efficacy Scale in Rank Order by Mean

	Teacher		Principal	
Rank	Item No.	*M*	Item No.	*M*
1	Item 11*	5.91	Item 11*	5.88
2	Item 12*	5.44	Item 12*	5.75
3	Item 4*	5.29	Item 5	5.50
4	Item 5	5.18	Item 4*	5.38
5	Item 3*	5.09	Item 3*	5.25
6	Item 9*	4.91	Item 8*	5.25
7	Item 2	4.76	Item 10	5.00
8	Item 10	4.53	Item 1	4.88
9	Item 8*	4.48	Item 2	4.75
10	Item 1	4.25	Item 9*	4.75
11	Item 6	4.08	Item 6	4.63
12	Item 7	3.98	Item 7	4.13
Scale		4.82		5.09

Notes. Items were scored on a 6-point Likert scale. *Items were reverse-scored.

In addition to the total scores on perceptions of teacher efficacy and collective teacher efficacy, it is helpful to examine how the teachers' and principals' perceptions of efficacy compare by school. This information is listed in Table 9. For teachers' perceptions of individual teacher efficacy, School A and School B scored higher than the mean score of 7.18 for all teachers across all schools (A - C), while School C scored lower than this mean. For teachers' sense of collective teacher efficacy within their schools, School A scored the same as the mean score of 4.82 for all teachers across all schools (A - C); School B scored higher than this mean, and School C again scored lower. In terms of principals' perceptions of collective teacher efficacy within their schools, the principals in Schools A and B scored higher than the mean of 5.09 for all principals across all schools (A - C), and School C scored lower. Additionally, in the case of all three schools, the principals' perception of collective teacher efficacy exceeded the teachers' perception of collective teacher efficacy, indicating that the principals tended to estimate more highly the impact of the faculty on student learning. Interestingly, School A's principals not only scored the highest of any group on perception of collective teacher efficacy, but the standard deviation was very small (.05) indicating little deviation from the mean. The three principals at School A were closest in consensus in terms of their perception of collective teacher efficacy.

Table 9

Teacher Efficacy and Collective Efficacy Scores by School

Group		Teacher Efficacy		Collective Efficacy	
		M	*SD*	*M*	*SD*
School A	Teachers (*n* = 87)	7.20	.68	4.82	.50
	Principals (*n* = 3)			5.30	.05
School B	Teachers (*n* = 87)	7.19	.72	5.01	.48
	Principals (*n* = 3)			5.25	.59
School C	Teachers (*n* = 42)	7.10	1.01	4.43	.63
	Principals (*n* = 2)			4.54	.76
All Schools	Teachers (*N* = 216)	7.18	.77	4.82	.56
	Principals (*N* = 8)			5.09	.55

Notes. Teacher efficacy was scored on a 9-point Likert scale. Collective efficacy was scored on a 6-point Likert scale. Principals completed this collective efficacy scale only.

It is critical to examine the reliability of participants' test scores and compare them to the reliability measures determined by prior researchers (Henson, Kogan, & Vacha-Haase, 2001). The authors of the Teachers' Sense of Efficacy Scale reported a reliability alpha of .90 for the short form (Tschannen-Moran & Hoy, 2001). The present study revealed a Cronbach's alpha equal to .89 for reliability of scores of the teacher participants. Goddard (2002b) reported high internal reliability on teacher scores on the short form of the Collective Efficacy Scale, with an alpha equal to .96. In the present study, a Cronbach's alpha of .84 was shown for the internal consistency of teachers' scores on this measure of collective efficacy, with an alpha of .89 for the principals' scores.

Correlation and Regression

The correlational analysis between the teacher efficacy scores and the collective efficacy scores, both of which are expressed as continuous, interval scores, was determined using the product moment correlation coefficient, or Pearson *r*. In the present study, a positive correlation of .351 was found between teachers' sense of efficacy and teachers' perception of collective efficacy at a statistically significant level ($p < .01$). Using standard inference testing techniques, the *r* critical value ($df = 214$, $p < .01$) was .254. Since the *r* observed value of .351 for this sample exceeded the *r* critical value, the null hypothesis was rejected, and the correlation coefficient was concluded to be significantly different from zero. This implied a low, directionally positive relationship between the two variables; an increase in a teacher's perception of teacher efficacy would indicate an increase in a teacher's perception of collective efficacy, and an

increase in a teacher's perception of collective efficacy would indicate an increase in a teacher's perception of teacher efficacy.

A standard multiple regression analysis as shown in Table 10 was performed between teachers' sense of teacher efficacy as the dependent variable and the teachers' collective efficacy scores and recoded teacher demographic variables (see Table 2) as the independent variables. Linear regression plots were used to aid in the validation of the assumptions of normality, linearity, and equality of error variances. An R^2 of .284 and an adjusted R^2 of .209 indicated enough of an effect to analyze further. These values are shown in the first three rows of Table 10, along with the regression summary. R for regression was significantly different from zero, with F (19, 182) = 3.79, $p < .001$. Knowing that small and non-meaningful effects can be statistically significant with a sufficiently large sample, the results of this regression were reviewed within the context of sample size. With a sample size as small as 57, the R^2 value would still have been statistically significant as displayed in Table 10.

Table 10

Teacher Efficacy Regression Summary

Source	*SS*	*df*	*MS*	*F*	*Sig*	R^2	*Adj* R^2
n = 202							
Regression	33.135	19	1.744	3.794**	7.3E-07	.284	.209
Residual	83.650	182	.460				
Total	116.785	201					
n = 57							
Regression	57.400	19	3.021	1.882*	.0489	.492	.209
Residual	59.385	37	1.605				
Total	116.785	56					
n = 56							
Regression	57.999	19	3.053	1.869	.052	.497	.209
Residual	58.785	36	1.633				
Total	116.785	55					

Notes. Adapted from Thompson & Kieffer (2000, p. 7).

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

Additional statistics for the multiple regression analysis between teachers' sense of teacher efficacy as the dependent variable and the teachers' collective efficacy scores and recoded teacher demographic variables as the independent variables are listed in Table 11. The first column lists the regression weights, or unstandardized regression coefficients (*B*), which are calculated for each predictor variable by dividing the Pearson *r* of each dependent variable by Multiple *R* from the regression analysis. The second column shows the standardized regression coefficients (beta weights), which are in standard score form. In the third column are the structure coefficients (r_s), which show the degree of relationship of each independent variable with the predicted values of the dependent variable. The fourth column shows the squared structure coefficients (r_s^2), which indicate the proportion of variance in the dependent variable, teacher efficacy, by the predictors.

To interpret regression results accurately, it is critical to review both beta weights and structure coefficients (Thompson, 1992). According to rank of beta weights as shown in Table 11, the variable with the largest effect was the collective efficacy score with a beta weight of .405, which indicates moderate positive correlation with teacher efficacy. The second ranking variables were secondary certification, technical (science and math) certification, and technical (science and math) teachers. Even though these three variables demonstrated the same magnitude in relationship, the direction was different. The secondary teacher certification variable yielded a positive beta weight of .258, which represents a low positive correlation of this variable with teacher efficacy. However, the squared structure coefficient for the secondary teacher certification

variable was only .001, indicating an explanation of less than 1% of the variance in teacher efficacy. The technical teacher certification variable, referring to teachers with science or mathematics teaching certification, yielded a negative beta weight of -.258, which represents a low negative correlation with teacher efficacy. However, this variable also indicated a very low squared structure coefficient of .013, meaning only about 1% of the variance was accounted for in teacher efficacy. The technical teacher variable, referring to math and science teachers, yielded a positive beta weight of .258, which represents a low positive correlation with teacher efficacy. However, this variable also indicated a very low squared structure coefficient of .011, meaning only about 1% of the variance was accounted for in teacher efficacy.

As shown by the squared structure coefficients in Table 11, the variables that offered the most explanation of the variance in teacher efficacy scores were the collective efficacy score, number of years of experience, and number of years experience at the current school. The results showed a noteworthy effect size, with these three variables explaining about 75% of the variance in teachers' perceptions of teacher efficacy. Specifically, the collective efficacy score, with a squared structure coefficient of .434, accounted for 43.4% of the variance in the teacher efficacy score, the largest amount of any variable in this study. The second ranking variable in terms of squared structure coefficients (.174) was years of teaching experience, which explained about 17% of the variance in teacher efficacy. The third ranking variable was years at the current school, with a squared structure coefficient of .142, indicating an explanation of about 14% of the variance in teacher efficacy. Interestingly, the next ranking variables were all related to elementary teaching. The fourth ranking variable was elementary

certification, with a squared structure coefficient of .095, accounting for about 9.5% of the variance in teacher efficacy. Ranking fifth according to squared structure coefficients (.082) was the “teach interdisciplinary” variable, referring to teachers whose subject area was interdisciplinary or generalist as in the case of most elementary teachers in this study, and this variable explained about 8% of the variance in teacher efficacy. The sixth ranking variable was the elementary teacher variable, with a squared structure coefficient of .074, explaining about 7% of the variance in teacher efficacy. The sum of the structure coefficients for these three variables, all of which are related to elementary teaching, was .251, which accounted for about 25% of the variance in teacher efficacy. Additionally, the variables of state certification, graduate degree, interdisciplinary certification, and secondary teacher each explained about 5% of the variance in teachers’ perceptions of teacher efficacy. Contributing least to the variance in teacher efficacy, in descending order, were the variables of gender, K-12/All level certificate, technical certification, technical teacher, age, ethnicity, particular school, and secondary certification as seen by the squared structure coefficients in Table 11. For the teachers in this study, these variables had very little effect on the teachers’ perceptions of teacher efficacy.

Table 11

Predictor Variables' Coefficients on Teacher Efficacy

Variable	*B*	*Beta*	r_s	r_s^2
(Constant)	4.929			
Collective Efficacy	.547	.405	.659	.434
Age	-.013	-.187	.107	.011
Years teaching	.008	.091	.417	.174
Years at school	.032	.238	.377	.142
Gender	-.201	-.102	-.182	.033
Caucasian	-.168	-.050	-.058	.003
Graduate degree	.358	.227	.233	.054
State certificate	.078	.042	.242	.059
Elementary certificate	.329	.204	.308	.095
Secondary certificate	.403	.258	-.017	.000
K-12/All level certificate	.029	.015	-.159	.025
Technical certification	-.537	-.258	-.114	.013
Interdisciplinary certification	-.189	-.124	.231	.053
Elementary teacher	-.204	-.132	.272	.074
Secondary teacher	-.351	-.230	.212	.045
Teach technical	.503	.258	-.103	.011
Teach interdisciplinary	.190	.125	.287	.082
School A	-.001	-.001	.043	.002
School B	-.372	-.240	.030	.001

Notes. r_s = structure coefficient, r_s^2 = squared structure coefficient.

An additional standard multiple regression analysis was performed between collective efficacy as the dependent variable and the teacher efficacy scores and recoded demographic variables as the independent variables. Linear regression plots were used to aid in the validation of the assumptions of normality, linearity, and equality of error variances. An R^2 of .395 and an adjusted R^2 of .322 indicated enough of an effect to analyze further. These values are shown in the first three rows of Table 12, along with the regression summary. *R* for regression was significantly different from zero, with F (19, 182) = 6.26, $p < .001$. Knowing that small and non-meaningful effects can be statistically significant with a sufficiently large sample, the results of this regression were reviewed within the context of sample size. With a sample size as small as 40, the R^2 value would still have been statistically significant as displayed in Table 12.

Table 12

Collective Efficacy Regression Summary

Source	*SS*	*df*	*MS*	*F*	*Sig*	R^2	*Adj* R^2
n = 202							
Regression	22.518	19	1.343	6.345**	2.2E-12	.398	.332
Residual	83.650	182	.460				
Total	116.785	201					
n = 40							
Regression	43.200	19	2.274	2.182*	.0456	.675	.332
Residual	20.841	20	1.042				
Total	64.041	39					
n = 39							
Regression	43.777	19	2.304	2.160	.051	.684	.332
Residual	20.254	19	1.067				
Total	64.041	38					

Notes. Adapted from Thompson & Kieffer (2000, p. 7).

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

Additional statistics for the multiple regression analysis between teachers' perception of collective teacher efficacy as the dependent variable and the teachers' sense of teacher efficacy and recoded demographic variables as the independent variables are listed in Table 13. The first column lists the regression weights, or unstandardized regression coefficients (*B*). In the second column are the standardized regression coefficients, or beta weights. The third column shows the structure coefficients (r_s), and the fourth column indicates the squared structure coefficients (r_s^2), which show the proportion of variance in the dependent variable, collective teacher efficacy, by the predictors or independent variables.

To interpret regression results adequately, it is important to review both beta weights and structure coefficients (Thompson, 1992). According to rank of beta weights as shown in Table 13, the variable with the largest effect was School B, with a beta weight of .537, which indicates a moderate positive correlation with collective teacher efficacy. The second ranking variable was teacher efficacy, with a beta weight of .342, indicating a low positive correlation with collective teacher efficacy. The next ranking variables were as follows: School A, with a beta weight of .296; the elementary teacher variable, with a beta weight of .281; and technical (science and mathematics) certification, with a beta weight of .224. Of these three variables, only the elementary teacher variable explained much variance in collective teacher efficacy with a squared structure coefficient of .217. The variables of School A and technical certification explained less than 1% of the variance in collective teacher efficacy according to squared structure coefficients.

As shown in Table 13 by the squared structure coefficients, most of the variance in collective teacher efficacy scores was explained by the variables of teacher efficacy score, elementary teacher, School B, and state certification. The results showed a noteworthy effect size, with these four variables explaining about 87% of the variance in teacher efficacy. Specifically, the teacher efficacy score, with a squared structure coefficient of .311, accounted for about 31.1% of the variance in the collective teacher efficacy score, the largest amount of any variable in this study. The second ranking variable in terms of squared structure coefficients (.217) was elementary teacher, which explained almost 22% of the variance in collective teacher efficacy. The third ranking variable was school B, with a squared structure coefficient of .142, indicating an explanation of about 14% of the variance in collective teacher efficacy. Ranking fourth was the variable of state certification, with a squared structure coefficient of .154, accounting for about 15% of the variance in collective teacher efficacy. The fifth ranking variable was secondary teacher, with a squared structure coefficient of .138, explaining almost 14% of the effect on collective teacher efficacy. The next three ranking variables were all related to elementary teaching, with both elementary certification (r_s^2 = .104) and interdisciplinary teachers (r_s^2 = .096) accounting for about 10% of the variance in collective teacher efficacy and interdisciplinary certification, (r_s^2 = .077) explaining almost 8% of the effect on collective teacher efficacy. The sum of the structure coefficients for these three variables related to elementary teaching was .277, accounting for almost 28% of the variance in collective teacher efficacy. Two variables ranked ninth (r_s^2 = .076) were secondary certificate and gender (referring to female teachers), each explaining slightly more than 7% of the variance in collective teacher

efficacy. Additionally, the variable of number of years teaching (r_s^2 = .046) contributed about 5% of the variance in collective teacher efficacy, with the variables graduate degree (r_s^2 = .033) and years at the current school (r_s^2 = .026) each explaining about 3% of the variance. Contributing least to the variance in collective teacher efficacy, in descending order, were the variables of age, technical teaching, ethnicity, technical certification, K-12/All level certificate, and School A as seen by the squared structure coefficients in Table 13. For the teachers in this study, these variables had very little effect on the teachers' perceptions of collective teacher efficacy in their schools.

Table 13

Predictor Variables' Coefficients on Collective Efficacy

Variable	*B*	*Beta*	r_s	r_s^2
(Constant)	2.383			
Teacher Efficacy	.253	.342	.558	.311
Age	.004	.083	.138	.019
Years teaching	.003	.042	.215	.046
Years at school	-.010	-.105	.162	.026
Gender	.083	.057	-.275	.076
Caucasian	-.063	-.025	-.119	.014
Graduate degree	-.208	-.179	.183	.033
State certificate	.116	.085	.393	.154
Elementary certificate	-.165	-.139	.322	.104
Secondary certificate	-.192	-.166	-.275	.076
K-12/All level certificate	.002	.001	.032	.001
Technical certification	.346	.224	-.095	.009
Interdisciplinary certification	.110	.098	.278	.077
Elementary teacher	.323	.281	.466	.217
Secondary teacher	.108	.096	-.372	.138
Teach technical	-.259	-.180	-.135	.018
Teach interdisciplinary	-.002	-.002	.310	.096
School A	.340	.296	.010	.000
School B	.616	.537	.436	.190

Notes. r_s = structure coefficient, r_s^2 = squared structure coefficient.

Summary

This chapter provided the statistical analyses of the data collected for this study of teachers' perceptions of efficacy. Descriptive statistics, factor analysis, correlational analysis, and multiple regression analysis results were described and listed in table format. In Chapter 5, the analyzed data will be discussed in terms of this study's hypotheses relating to (1) the relationship between conservative Christian school teachers' perceptions of teacher efficacy and collective efficacy, (2) the relationship between the independent variables of collective teacher efficacy and teacher demographic characteristics (age, gender, ethnicity, school campus, years of teaching experience, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught) and the dependent variable of teacher efficacy, and (3) the relationship between the independent variables of teacher efficacy and teacher demographic characteristics and the dependent variable of collective efficacy. Additionally, Chapter 5 will include a discussion comparing and contrasting this study's findings with past studies, the impact and implications of the results of this study for conservative Christian school environments, and suggestions for further research.

CHAPTER 5

DISCUSSION OF RESULTS

Introduction

This chapter provides a review of the research question, hypotheses, and results related to the constructs of teacher efficacy, collective teacher efficacy, and teacher demographic characteristics within conservative Christian school environments. The findings of this study are compared and contrasted with past studies and the implications of the results of the present study are addressed. Additionally, limitations of this efficacy research are noted, as well as recommendations for future research in the field of education. Finally, the importance of this study is suggested.

Research Question

The overriding research question addressed in this study was, “What is the relationship between individual conservative Christian school teachers’ perceptions of teacher efficacy, perceptions of collective teacher efficacy, and teacher demographic characteristics, including age, gender, ethnicity, school campus, number of years teaching, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught?”

The first hypothesis made to assist in answering this question was, “There is a statistically significant relationship at the .05 level between conservative Christian school teachers’ perceptions of individual teacher efficacy and perceptions of collective teacher efficacy.” The first null hypothesis stated there is no statistically significant

relationship at the .05 level between conservative Christian school teachers' perceptions of individual teacher efficacy and perceptions of collective teacher efficacy. The correlational analysis between the teacher efficacy scores and the collective efficacy scores, both of which are expressed as continuous, interval scores, was determined using the product moment correlation coefficient, or Pearson *r*. The *r* observed value of .351 for the sample in this study exceeded the *r* critical value, and the correlation coefficient was significantly different from zero ($p < .01$). This indicated a low, positive relationship between the two variables. Research hypothesis 1 was sustained, and null hypothesis 1 was rejected.

The second hypothesis formulated in this research was, "With respect to conservative Christian school teachers, there is a statistically significant relationship at the .05 level for the independent variables of (a) teachers' perceptions of collective teacher efficacy and (b) teacher demographic characteristics (age, gender, ethnicity, school campus, years of teaching experience, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught) and the dependent variable of teachers' perceptions of individual teacher efficacy." The second null hypothesis stated there is no statistically significant relationship at the .05 level for the independent variables of teachers' perceptions of collective teacher efficacy and teacher demographic characteristics, and the dependent variable of teachers' perceptions of individual teacher efficacy. Given the predictors used in a standard multiple regression analysis yielding $R^2 = .284$, this was a noteworthy effect size at a statistically significant level ($p < .001$). Knowing that small and non-meaningful effects

can be statistically significant with a sufficiently large sample, the results of this regression were reviewed within the context of sample size. With a sample size as small as 57, the R^2 value would still have been statistically significant. *R* for regression was significantly different from zero, with F (19, 182) = 3.79, $p < .001$. Therefore, research hypothesis 2 was sustained and null hypothesis 2 was rejected.

The third research hypothesis stated, "With respect to conservative Christian school teachers, there is a statistically significant relationship at the .05 level for the independent variables of (a) teachers' perceptions of individual teacher efficacy and (b) teacher demographic characteristics (age, gender, ethnicity, school campus, years of teaching experience, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught) and the dependent variable of teachers' perceptions of collective teacher efficacy." The third null hypothesis stated there is no statistically significant relationship at the .05 level for the independent variables of teachers' perceptions of individual teacher efficacy and teacher demographic characteristics, and the dependent variable of teachers' perceptions of collective teacher efficacy. Given the predictors used in a standard multiple regression analysis yielding $R^2 = .395$, this was a noteworthy effect size at a statistically significant level ($p < .001$). Knowing that small and non-meaningful effects can be statistically significant with a sufficiently large sample, the results of this regression were reviewed within the context of sample size. With a sample size as small as 40, the R^2 value would still have been statistically significant. *R* for regression was significantly different from zero, with *F*

(19, 182) = 6.26, $p < .001$. Therefore, research hypothesis 3 was sustained, and null hypothesis was rejected.

Discussion

Knowing that teachers' perceptions of both teacher efficacy and collective teacher efficacy positively impact student achievement, it is vital to consider how to strengthen teachers' perceptions of these individual and group constructs. Both participation in teacher research (Henson, 2001a) and mentoring new teachers (Yost, 2002) have contributed to growth in teacher efficacy. A supportive school principal, actively involved in formative teacher evaluations and who values good teaching, can positively impact teachers' sense of efficacy (Chester & Beaudin, 1996, Ebmeier, 2003). Additionally, teachers' efficacy beliefs have been strengthened when faculty morale was high (Hoy & Woolfolk, 1993), when other teachers and administrators had high expectations for student achievement (Woolfolk, 1998), and when they experienced high degrees of collaboration with peers (Chester & Beaudin, 1996). In terms of strengthening collective teacher efficacy, research has shown academic press (Hoy et al., 2002a), organizational effectiveness (Olivier, 2001), and teacher influence over school decisions (Goddard, 2002a; Goddard et al., 2004) to be related to stronger perceptions of collective efficacy.

The problem addressed in this study, as stated in Chapter 1, was to determine whether teachers' perceptions of self-efficacy and collective efficacy are interrelated and how these two constructs may be impacted by teacher characteristics, such as educational level, grade level taught, and number of years of teaching experience. A positive correlation between teachers' perceptions of teacher efficacy and collective

efficacy at a statistically significant ($p < .05$) level was expected. Prior researchers conducted a correlational analysis between public school teachers' perceptions of teacher efficacy and collective efficacy, noting a Pearson *r* of .42 (Goddard et al., 2000) and a Pearson *r* of .37 (Kurz, 2001). The present study used newer measures of teacher efficacy and collective efficacy yielding a Pearson *r* of .35. In pairing just these two variables, squaring the correlation coefficient (.35) yields a proportion of variance of .12, which indicates that 12% of the variance in either teacher efficacy or collective efficacy is associated linearly with variance in the other. When combining these variables in a multiple regression analysis with teacher demographic variables added, this study confirmed the relationship between teacher efficacy and collective efficacy.

Past researchers have found collective efficacy to be the strongest predictor of variance in teacher efficacy (Goddard, 2003, Goddard & Goddard, 2001; Goddard et al., 2004). Other research has shown teacher efficacy to be the strongest predictor of variance in collective efficacy (Caprara et al., 2003). A comparable relationship was expected between teacher efficacy and collective efficacy in the present study. In the multiple regression analyses, collective efficacy explained the largest amount (43%) of variance in teacher efficacy, and teacher efficacy explained the largest amount (31%) of variance in collective efficacy. Additionally, in the literature review for this study, no teacher efficacy research in the conservative Christian school setting was found; therefore, the present study contributes to the existing literature by expanding the research to a new, previously unexplored setting.

Further analyses in this study were designed to include teacher demographic characteristics, including age, gender, ethnicity, school campus, number of years

teaching, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught, to determine the possibility of relative effects on teacher efficacy. After the collective efficacy variable, the demographic variables in this study with the largest effect on teacher efficacy were (1) years of teaching experience, explaining about 17% of the variance in teacher efficacy, and (2) number of years of teaching at the current school, which explained about 14% of the variance in teacher efficacy. Teachers with more years of experience and teachers with more years in the same school tended to have higher perceptions of individual teacher efficacy.

One prior study confirms the contribution of years of teaching experience to perception of teacher efficacy (Soodak & Podell, 1996), while another showed no effect (Hoy & Woolfolk, 1993). No past research that considered number of years of teaching at the current school could be found.

The present study also showed that teaching on the elementary school level, as evidenced by the squared structure coefficients for the three combined variables of elementary certification, interdisciplinary teaching, and being an elementary teacher, accounted for about 25% of the variance in teacher efficacy. Past research has shown that elementary teachers tended to have a higher perception of teacher efficacy (Soodak & Podell, 1996). Quite possibly, it is easier for teachers of younger students to detect their impact on children than for teachers of older students. A critical aspect of the secondary principal's role should be to provide strong support for teachers, set high expectations for students, and promote faculty morale and collaboration to promote higher perceptions of teacher efficacy.

In terms of the age of teachers, very little effect on individual teacher efficacy was found in this study, similar to prior research (Hoy & Woolfolk, 1993). Likewise, gender had little effect on individual teacher efficacy in this study, which is similar to findings from past research (Hoy & Woolfolk, 1993). However, one scholar (i. e. Kurz, 2001) did find that female secondary teachers had higher perceptions of teacher efficacy than did their male peers. The present study differs from Kurz's study in that it includes all grade levels from kindergarten through twelfth grade, rather than focusing on secondary teachers alone.

Past research has shown that teachers with a graduate degree have higher perceptions of individual teacher efficacy (Hoy & Woolfolk, 1993); however, in the present study, the effect of earning a graduate degree contributed very little to the variance in teacher efficacy. No other studies addressing other teacher demographic variables were found.

Additional analyses in this study were designed to include teacher demographic characteristics, including age, gender, ethnicity, school campus, number of years teaching, number of years teaching at the current school, highest degree received, type of teacher certification, certification grade level and subject area, grade level taught, and particular subject taught, to determine the possibility of relative effects on collective efficacy. After the individual teacher efficacy variable, the demographic variable with the largest effect on collective efficacy was that of being an elementary teacher, which explained almost 22% of the variance. Combining the squared structure coefficients for the elementary teacher variable with the variables of elementary teaching certificate, interdisciplinary teacher, and interdisciplinary or generalist certification area, accounted

for about 49% of the variance in collective efficacy. The variables of being a secondary teacher and having secondary certification combined to explain about 21% of the variance in collective teacher efficacy. Interestingly, the variable with the second highest effect on collective teacher efficacy was School B. Reviewing information about this school showed it to be the most well established of the three schools in terms of length of existence as an educational institution. Informal interviews with principals revealed excellent functioning of academic departments, weekly team leader meetings during lunch, and a perception by principals that teachers are very much invested in the continuous school improvement process. Furthermore, a review of collective efficacy scores by school (see Table 9) indicated School B to have the highest mean of teachers' perception of collective efficacy. These and other factors particular to School B could account for such a large effect on the variance of collective teacher efficacy. Only one prior study was found (i.e. Kurz, 2001) that investigated similar teacher demographic variables and perceptions of collective teacher efficacy, and it yielded no statistically significant relationships. That study was conducted in a Texas public secondary school, which differed from the sample of kindergarten through twelfth grade conservative Christian school teachers used in this study.

Some observations between the two multiple regression analyses in the present study were noted. The independent variables of elementary teacher and elementary certification contributed almost 17% of the variance in individual teacher efficacy and about 32% of the variance in collective teacher efficacy. The independent variables of secondary teacher and secondary certification contributed only about 5% of the variance in individual teacher efficacy and about 21% of the variance in collective

teacher efficacy. Apparently, elementary teachers have a higher perception of both teacher efficacy and collective efficacy. Interestingly, secondary teachers' perception of individual teacher efficacy is lower, but the increase in perception of collective efficacy is much greater. Secondary teachers in this study tended to think more highly of the capability of the secondary teachers in their respective schools to make a difference in students' achievement than they did in their own individual capacity as a teacher.

In terms of teachers' perceptions of individual teacher efficacy, there is a strong implication, according to the results of this study, that hiring teachers with more years of teaching experience and keeping teachers at the same school for a period of years could contribute to more highly efficacious teachers. In terms of teachers' perceptions of both individual teacher efficacy and collective teacher efficacy, the results of this study showed that elementary teachers' perceptions are higher than secondary teachers' perceptions. The obvious implication would be to analyze further why this is so, with an attempt on a practical level to investigate how to increase secondary teachers' perceptions of both individual teacher efficacy and collective teacher efficacy.

The results of this study may be generalizable to most conservative Christian schools with populations similar to the participants surveyed in this research. Findings based on the data from this study must be used with caution, however, and only applied to similar populations.

It is important to note that each of the three schools in this study had similar doctrinal statements or statements of faith. All employees at the schools are required to sign the statement, indicating full agreement with it. The common elements of the three doctrinal statements are as follows. There is one God, the eternally existing, personal,

triune God: Father, Son, and Holy Spirit. Jesus Christ is God's Son, born of a virgin. He lived a sinless life, died to atone for the sins of mankind, was resurrected and ascended into heaven where He continually ministers as Great High Priest and Advocate. The Holy Spirit dwells in all believers and enables them to live godly lives. The Holy Bible is the inspired Word of God and it is the sole authority in every area of life. God created man in His image, but man inherited a sinful nature through Adam's sin. Salvation is by grace through faith in Jesus Christ, totally apart from human merit, and believers will spend eternity with God. Followers of the Lord Jesus Christ must live by God's commandments and witness by word and by deed.

In this study, the schools as organizations and the teachers employed in them appeared equally committed to excellence in education and biblical truth. It is possible that teachers' conservative Christian beliefs and values influenced their perceptions of individual teacher efficacy and collective teacher efficacy. A concept to explore in future studies is the possible relationship between faith and efficacy.

Limitations

The most obvious limitation of the present study was the nonexperimental nature of the research. The convenience sample consisted of the entire faculty from three schools, similar in location, mission, and doctrinal stance. Even though the sample size of 216 practicing teachers was adequate as shown by the review of the multiple regression analyses within the context of sample size, the sample was not random.

A less obvious concern was the nature of the wording in the short form of the Collective Efficacy Scale (Goddard, 2002b). Six of the twelve items surveying teachers' perceptions of the collective efficacy within their schools were reverse-scored (Items 3,

4, 8, 9, 11, and 12). At least one of the principals misread one of the reverse-score items, and during a follow-up interview, it was corrected. Possibly other participants misread the negatively worded statements. Since the first survey given was the teacher efficacy survey, with no reverse-scoring items, participants may have been less prepared to read carefully the items and mark their true perception as their response.

Finally, an inherent limitation associated with this study was the self-reporting of data on each of the efficacy instruments as well as the demographic survey. It must be assumed that these three surveys were completed accurately and truthfully by the participants.

Recommendations

The results of this study may be generalizable to most conservative Christian schools with similar populations. A possible extension of studying conservative Christian school teachers' perceptions of efficacy would be to include conservative Christian values and beliefs as a variable in research to explore connections between faith and efficacy.

Future researchers may wish to extend this investigation into other conservative Christian schools that are much smaller, that serve the minority community, that employ faculty members reflecting more diverse populations, or that are located in urban settings or rural settings. Other researchers may consider replicating this study in other types of private schools or in public schools.

Another recommendation would be to consider the order of administering the surveys based on the wording of the items in the instrument. Reverse-scoring issues with negatively worded items might be minimized if the survey with reverse-scoring

items was administered prior to a survey with no reverse-score items. Specifically, there was a concern regarding the short form of the Collective Efficacy Scale (Goddard, 2002b). Half of the items were negatively worded and reverse-scored. If both instruments used in the present study are used simultaneously in the future, researchers are advised to administer the Collective Efficacy Scale first, since the Teachers' Sense of Efficacy Scale – Short Form (Tschannen-Moran & Hoy, 2001) does not contain reverse-scored items. Another suggestion would be to advise participants to read each item carefully since some items are worded negatively.

Finally, for research conducted in conservative Christian schools in which both state certification and certification through organizations such as the Association of Christian Schools International (ACSI) is common, it may be prudent to categorize the data differently for type of certification. In the present study, participants were classified as state certified, Christian organization (such as ACSI) certified, other certification, or none. Teachers with both state and ACSI certifications were grouped under the state certification category. This recommendation is made due to the state certification variable contributing about 15% of the variance on collective efficacy.

Summary

The intent of this chapter was to provide the findings and conclusions of the exploration of possible relationships among teachers' perceptions of teacher efficacy, collective efficacy, and teacher demographic characteristics in conservative Christian schools. This study is important because it extends the limited research that investigates the nested relationship between teacher efficacy and collective efficacy in our schools. Additionally, this study was designed to meet the need for inclusion of

teacher demographic characteristics in efficacy research. Furthermore, this study is important because it was devoted to the exploration of the perceptions of teachers in conservative Christian schools, an under-served research community.

APPENDIX A

TEACHER DEMOGRAPHIC CHARACTERISTICS

Please answer every question to the best of your ability. Your answers will remain confidential.

1. What is your age? _____

2. What is your gender? ___Male ___Female

3. What is your ethnicity? African-American American Indian/Alaskan Native

Asian/Pacific Islander Caucasian

Hispanic Other

4. How many years have you been teaching? _____

5. How many years have you been teaching at this school? _____

6. What is your highest degree you have received? Associate Bachelors

Masters Doctorate

7. What is your teacher certification? ___ State ___ ACSI ___None

___Other (please list _____)

8. What is your certification grade level?

Elementary Middle School/Secondary K-12 all level

9. What is your certification subject area? Science Social Studies Math

English/Language Arts Fine Arts Interdisciplinary/Generalist

Other _____

10. What grade level do you primarily teach?

Elementary Middle School/Secondary K-12 all level

11. What subject(s) or particular grade level do you primarily teach?

Science Social Studies Math English/Language Arts

Fine Arts Self-contained/All subjects Other_____

Thank you for participating in this research!

APPENDIX B

SCRIPT FOR THE ADMINISTRATION OF SURVEYS

This survey is part of a doctoral student's dissertation research at the University of North Texas. The purpose of this study is to gather information regarding educators' perceptions about their schools. There are no correct or incorrect answers. The doctoral student is only interested in your frank opinion.

Your responses will be completely confidential. Strict procedures to insure the confidentiality of all participants have been approved by the Human Subjects Review Board of the university. Data will be compiled at the school level; no individual scores will be reported. Your school headmaster has approved this research, as well as the South Central director for the Association of Christian Schools International.

The doctoral student would be pleased to share the results of this study at a later time and will donate a copy of the completed dissertation to the school library.

Your time and your insights are valuable resources. Thank you for your willingness to share your perceptions that will contribute to our knowledge about education.

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