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The Relationship Between Self-Efficacy, School and Personal Characteristics, and Principal Behaviors Related to Affecting Student Achievement

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THE RELATIONSHIP BETWEEN SELF-EFFICACY, SCHOOL AND PERSONAL CHARACTERISTICS, AND PRINCIPAL BEHAVIORS RELATED TO AFFECTING STUDENT ACHIEVEMENT

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CERTIFICATE OF APPROVAL

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DEDICATION

For my daughters, Lilly and Riley,

in hopes that you, too, will dream big, work hard, and never stop learning.

ABSTRACT

The purpose of this study was to gain insight into current principals' beliefs and behaviors in an attempt to identify the driving forces behind principal behaviors related to indirectly and directly affecting student achievement. The study utilized Canonical Correlation Analysis to examine the relationship between principals' perceived self-efficacy (efficacy for management, efficacy for instructional leadership, and efficacy for moral leadership), school and personal characteristics (principal gender, school level, student socioeconomic status, perceived parental involvement, and time spent on student discipline), and principals' behaviors related to indirectly and directly affecting student achievement. The study found that perceived self-efficacy was significantly related to principal behavior. The study also found that school and personal characteristics were not significantly related to principal behavior.

Scholars have argued that self-efficacy, which this study found to contribute significantly to principal behavior, is within a principal's control. However, the five variables that were found to be insignificant in this study (principal gender, school level, student socioeconomic status, perceived parental involvement, and time spent on student discipline) are either completely out of a principal's control or very difficult to control. This study's findings should encourage principals that they have control over the variables that correlate with their behaviors related to indirectly and directly affecting student achievement. These findings do not present any definitive answers, but rather demonstrate that the relationship between self-efficacy and principal behavior is worthy of further exploration.

CHAPTER I

Purpose

Principal Effects on Student Achievement

The relationship between principal leadership and student achievement has been researched for more than 30 years. Beginning with early studies of effective schools in the 1970's, researchers have argued that principals can have a positive effect on student achievement (Austin, 1979; Edmonds, 1979; Hallinger, 2005; Hallinger & Heck, 1996; Leithwood & Jantzi, 2008; Leithwood & Montgomery, 1982; Marzano, Waters, & McNulty, 2005; Witziers, Bosker, & Kruger, 2003). Research since then has focused on whether principals have a *direct* or *indirect* effect on student achievement. Most researchers have argued that the effect of principal leadership on student achievement is indirect, with principals affecting student achievement by influencing school and classroom conditions (Hallinger, 2005; Halinger & Heck, 1996; Leithwood & Jantzi, 2008; Marzano et al., 2005; Witziers et al., 2003).

The current emphasis on accountability in education has reignited interest in researching principal effects on student achievement (Gentilucci & Muto, 2007; Hallinger, 2005; Leithwood & Riehl, 2003; Nettles & Herrington, 2007; O'Donnell & White, 2005; Silva, White, & Yoshida, 2011). The majority of existing principal effects studies used Hallinger and Murphy's (1986) model of instructional leadership (Hallinger, 2005). Hallinger and Murphy's model identified three dimensions of instructional leadership that were said to be fundamental to the position: defining the school's mission, managing the instructional program, and promoting a positive school learning climate (Hallinger, 2005). Silva et al. (2011) argued that Hallinger and Murphy's model is less

relevant in the current era of accountability because it does not account for the increasing pressure on principals to directly affect student achievement. Recently, researchers have used accountability as the impetus to study principal effects and found that principals can have a direct effect on student achievement (Gentilucci & Muto, 2007; Silva et al., 2011).

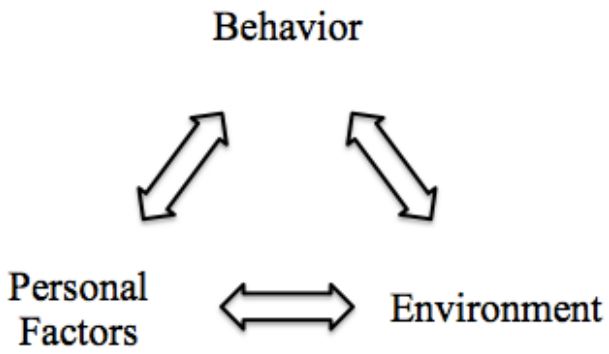
It is widely accepted that principals are facing increased pressure to improve student achievement in their schools. Principals who look to research for the most effective ways to address this pressure are finding conflicting data supporting both indirect and direct effects of principals on student achievement. Additionally, existing research fails to identify the "why." Why do some principals tend to behave in more indirect ways while other principals tend to behave in more direct ways? Tschannen-Moran and Gareis (2004) argued that the answer to that question lies in the thought process of principals, noting, "…what principals do is a direct consequence of what and how they think" (p. 573).

Theoretical Framework: Social Cognitive Theory

Bandura's Social Cognitive Theory asserts that human functioning is the product of a relationship between personal, behavioral, and environmental influences. Bandura criticized previous theorists, including Skinner, for basing their work on the notion that "people are merely repositories for past stimulus inputs and conduits for external stimulation – they can add nothing to their performance" (Bandura, 1997, p. 8). Instead, Social Cognitive Theory posits that people should be viewed as "self-organizing, proactive, self-reflecting and self-regulating rather than as reactive organisms shaped and

shepherded by environmental forces or driven by concealed inner impulses" (Pajares, 2002, p. 1). The central tenet of Social Cognitive Theory is Bandura's belief that people contribute to their own functioning through human agency. Human agency operates within a triadic reciprocality of personal, behavioral, and environmental influences, referred to as reciprocal determinism (Figure 1). The bidirectional relationships between personal, behavioral, and environmental influences indicate that people are both products and producers of their environment and of their social systems (Pajares, 2002).

Figure 1
Bandura's Conception of Reciprocal Determinism



Bandura (1997) identified perceived self-efficacy as the most influential mechanism of human agency. Perceived self-efficacy is defined as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3). Perceptions of self-efficacy influence human functioning in numerous ways. First, perceptions of self-efficacy influence the choices people make. People are more likely to choose to participate in tasks and activities in which they feel confident and competent. Second, perceptions of self-efficacy influence levels of effort, perseverance, and resilience that people demonstrate when completing

tasks (Evans, 1989). People with a high sense of efficacy will exert higher levels of effort, perseverance, and resilience, viewing difficult tasks as challenges to be mastered rather than threats to be avoided. Third, perceptions of self-efficacy influence thought patterns and emotional reactions. People with high self-efficacy may experience less anxiety, stress, and depression when approaching difficult tasks (Bandura, 1997).

Self-efficacy develops from four primary sources. First, people form their efficacy beliefs through enactive mastery experience. According to Bandura (1997), "Enactive mastery experiences are the most influential source of efficacy information because they provide the most authentic evidence of whether one can muster whatever it takes to succeed" (p. 80). Past successes build efficacy while past failures undermine efficacy; easy past successes cause people to expect quick results while past experiences overcoming obstacles develop resilience (Bandura, 1997). Second, people form their efficacy beliefs through vicarious experiences in the form of modeling. Although less influential than enactive mastery experiences, vicarious experiences are particularly influential when people have limited past experience with a task (Pajares, 2002). Observing the successes of models with similar attributes can strengthen one's perceptions of efficacy while observing failures of models with similar attributes can undermine one's perceptions of efficacy (Pajares, 2002). Third, people form their efficacy beliefs through verbal persuasion. Bandura (1997) writes, "People who are persuaded verbally that they possess the capabilities to master given tasks are likely to mobilize greater effort and sustain it than if they harbor self-doubts and dwell on personal deficiencies when difficulties arise" (p. 101). It is often easier to weaken self-efficacy beliefs through negative verbal persuasion than to strengthen self-efficacy beliefs through

positive verbal persuasion (Pajares, 2002). Fourth, people form their efficacy beliefs through physiological and affective states that may be present when they perform a task. People gauge their efficacy for a task based on the anxiety, stress, arousal, and mood that they experience as they contemplate an action. Negative thoughts, fears, and a depressed mood can weaken self-efficacy beliefs (Pajares, 2002).

Self-efficacy has been linked to several areas of work-related performance including life insurance sales, faculty research productivity, coping with difficult career-related tasks, career choice, learning and achievement, and adaptability to new technology (Gist & Mitchell, 1992). It has been an excellent predictor of motivation and behavior in studies involving teachers, although it has not yet been widely researched in studies involving principals (Leithwood & Jantzi, 2008; Smith, Guarino, Strom, & Adams, 2006).

Bandura's (1986) Social Cognitive Theory provides a framework for examining psychosocial functioning. According to the theory, behavior patterns, personal factors, and environmental factors all influence each other in a triadic reciprocality. The concept of self-efficacy is at the core of this theory. Self-efficacy perceptions have been shown to be excellent predictors of behavior (Tschannen-Moran & Gareis, 2004). Specifically, Tschannen-Moran and Gareis (2004) found that principals with a high sense of self-efficacy were persistent in pursuing their goals, were flexible and willing to adapt strategies to meet contextual conditions, viewed change as a slow process, did not interpret their inability to solve problems immediately as failure, and were more likely to use personal power when carrying out their roles. Findings indicated that principals with a low sense of self-efficacy were less likely to identify appropriate strategies to meet

contextual conditions, persisted in their original course of action when confronted with failure, blamed others when challenged, and relied on external bases of power (Lyons & Murphy, 1994; Tschannen-Moran & Gareis, 2004). However, Leithwood and Jantzi's (2008) review of the literature found a paucity of research relating to principal self-efficacy. Furthermore, their review found that studies that did investigate principal self-efficacy often failed to investigate the concept within the complete reciprocal construct of Bandura's Social Cognitive Theory.

Bandura (2006) cautioned that self-efficacy is a context-specific construct and that "scales of perceived self-efficacy must be tailored to the particular domain of functioning that is the object of interest" (p. 307). Tschannen-Moran and Gareis (2004) reviewed the existing scales of perceived self-efficacy and identified a lack of an instrument that effectively captures the context-specific nature of principal efficacy beliefs. As a result, Tschannen-Moran and Gareis (2004) adapted a teacher efficacy scale to create the Principal Self-Efficacy Scale (PSES). Three subscales emerged during their factor analysis of the PSES: efficacy for management, efficacy for instructional leadership, and efficacy for moral leadership. Since then, several scholars have utilized the same three factors in their own studies involving the PSES (see Nye, 2008; Santamaria, 2008).

According to Bandura (1986), self-efficacy is not the sole predictor of behavior. Hallinger, Bickman, and Davis (1996) underscored the importance of also considering personal and environmental factors. They argued that leadership should be viewed as a contextually dependent variable that can be affected by school context, similar to what Bandura identified as environmental variables, and personal characteristics of the

principal. Hallinger et al. (1996) criticized many existing principal effects studies for failing to account for the possible effects of intervening variables. On the contrary, Goldring, Huff, May, and Camburn (2008) reviewed the literature and found several previous studies that focused on a broad range on intervening variables including socioeconomic status and school level. Extant research has identified several school and personal characteristics that had a significant relationship with principal efficacy, including principal gender, school level, student socioeconomic status, perceived parental involvement and time spent on student discipline (see Nye, 2008; Santamaria, 2008). Similar to self-efficacy research, existing research that considered personal and environmental factors often failed to do so within the complete reciprocal construct of Bandura's Social Cognitive Theory. In sum, principal leadership research that investigates the complete triadic relationship between self-efficacy, environment, and specific principal behaviors is lacking.

Purpose

Existing principal effects research presents conflicting findings and is limited by a failure to investigate the complete triadic relationship between principals' perceived self-efficacy (efficacy for instructional leadership, efficacy for moral leadership, and efficacy for management), school and personal characteristics (principal gender, school level, student socioeconomic status, perceived parental involvement, and time spent on student discipline), and principals' behaviors related to indirectly and directly affecting student achievement. The purpose of this study was to gain insight into current principals'

beliefs and behaviors in an attempt to identify the driving forces behind principal behaviors related to affecting student achievement.

Research Question

Data collected from public school principals in the state of Pennsylvania were used to investigate the following research question:

1. Is there a relationship between principals' self-efficacy (instructional leadership, moral leadership, management) and school and personal characteristics (student socioeconomic status, perceived parental involvement, time spent of student discipline, principal gender, school level), and behaviors related to indirectly and directly affecting student achievement?

Significance of the Study

The current study has significant implications for everyone involved in the field of educational leadership, including pre-service principals, new principals, experienced principals, district administrators, and university professors. Specifically, the current study identifies which school and personal characteristics, as well as which dimensions of self-efficacy, relate significantly to indirect and direct principal behaviors. The current study's focus on the driving forces behind principal behaviors related to affecting student achievement is a unique contribution to the research field, which, until now, has primarily

focused on the relationship between specific principal behaviors and student achievement.

Definitions of Terms

For the purpose of this study, these definitions were used for the following terms:

Self-Efficacy - belief in one's capabilities to organize and execute the courses of action required to produce given attainments (Bandura, 1997)

School and Personal Characteristics - characteristics of a school or a school principal, including principal gender, school level, percentage of students classified as economically disadvantaged, degree of parental involvement, and time spent on student discipline

Behaviors Related to Indirectly Affecting Student Achievement - a measurable cause for a change in performance, mediated by other variables (adapted from Silva et al., 2011)

Behaviors Related to Directly Affecting Student Achievement - a measurable cause for a change in performance, not mediated by other variables (Silva et al., 2011)

Reciprocal Determinism - the triadic reciprocality of personal, behavioral, and environmental influences, indicating that people are both products and producers of their environment and of their social systems (Bandura, 1997)

Limitations

This study was limited in three ways. First, this study relied on self-reported data. Discrepancies may exist between principals' self-reported behaviors and their actual behaviors. Second, this study used Canonical Correlation Analysis to analyze the data. While Canonical Correlation Analysis is an appropriate statistical technique for the study's research question, the use of more sophisticated statistical techniques (i.e. Hierarchical Linear Modeling) may have revealed additional findings. Based on the findings of this study, post-hoc data analysis may be conducted at a later time using more sophisticated statistical techniques. Third, this study only collected data from principals in the state of Pennsylvania. Due to the unique educational systems and political context in each state, generalizability of findings to other states may be limited.

CHAPTER II

Literature Review

Introduction

The *Report on Equality of Educational Opportunity*, also known as the Coleman Report, found that out-of-school factors, including race, family, background, and socio-economic status, had a greater effect on student achievement than in-school factors (Austin, 1979; Coleman, 1966). These findings conflicted with long-held beliefs related to the hypothesized influence of schools on student achievement (Jacobson, 2011; Klitgaard & Hall, 1973). However, deficiencies and inconsistencies within the report, including data collection methodology, design and validity of instruments, and statistical techniques used during data analysis, resulted in conflicting interpretations by many people, including national education policy makers. Based on Presidential advisor Moynihan's interpretation that schools and teaching were ineffective, President Nixon's 1970 education message called for a reduction in federal aid to school programs. During the same year, the U.S. Office of Education used the Coleman Report as evidence for its published assertion that teachers do make a difference (Guthrie & Morrelli, 1971).

In the years immediately following the release of the Coleman Report, scholars argued that weak methodology and poor design threatened the validity of its findings (Guthrie & Morrelli, 1971). Klitgaard and Hall (1973) criticized the Coleman Report for only considering the *average* effects of all schools on student achievement. Instead, Klitgaard and Hall (1973) focused their research on identifying unusually effective schools. Their intention was to inspire future research that would identify unique characteristics of effective schools to be replicated throughout the education system.

This review marked the beginning of the effective schools movement (Jacobson, 2011). Based on Klitgaard and Hall's (1973) finding that unusually effective schools do exist, New York, Pennsylvania, Delaware, and Maryland conducted studies of their own exemplary schools (Austin, 1979). Among other characteristics, the states' studies found that the most effective schools had: strong principal leadership; strong principal participation in the classroom instructional program and in actual teaching; higher expectations on the part of the principal for student and teacher performance advancement; principals with perceptions of control over the functioning of the school, the curriculum and program, and their staff; and greater experience and more pertinent education in the role of principal (Austin, 1979). These studies solidified the use of the variables composing the term "instructional leadership" as the link between principals and student achievement (Edmonds, 1979; Jacobson, 2011).

Behavior: Indirect Principal Effects on Student Achievement

Instructional leadership research in the years following the effective schools movement focused on the nature of the relationship between principal behaviors and student achievement. Several major literature reviews examined extant research, with researchers agreeing that the effect of principals on student achievement is small and primarily indirect. Hallinger and Heck's (1996) review of the literature from 1980 to 1995 identified 40 studies that examined the effects of principal beliefs and behaviors on student performance. The reviewers adapted Pitner's (1988) conceptual framework of principal effects to organize the 40 studies into five categories: direct effects, direct

effects with antecedent variables, mediated effects, mediated effects with antecedent variables, and reciprocal effects. Reciprocal effects studies consider the simultaneous effects of leadership on school outcomes and school outcomes on leadership. The researchers were unable to identify any reciprocal effects studies.

Hallinger and Heck's review included 22 studies that investigated a direct effect between principal leadership and student achievement (13 *direct effects without antecedent variables* studies and nine *direct effects with antecedent variables* studies). Findings from the 22 studies indicated that principals had no effect, or a weak effect, on student achievement. The *direct effects without antecedent variables* studies were criticized for using simple models to measure complex relationships. These studies were also criticized for failing to consider the influence of school and environmental conditions on principal leadership. The *direct effects with antecedent variables* studies took the important step of considering the influence of school and environmental conditions on principal leadership, but the studies were still limited by design problems and weak analytical methods (Hallinger & Heck, 1996). Hallinger and Heck argued that the findings of no or little effect from the 22 direct effects studies should be interpreted with caution because the studies used simplified models to measure a complex relationship.

Hallinger and Heck's (1996) review included 18 mediated effects studies (five *mediated effects without antecedent variables* studies and 13 *mediated effects with antecedent variables* studies). Findings from the *mediated effects without antecedent variables* studies indicated that principals had a weak but positive indirect effect on student achievement. The authors argued that the findings should be interpreted with

caution because, like the *direct effects without antecedent variables* studies, the studies failed to consider the influence of school and environmental conditions on principal leadership. Findings from 11 of the 15 *mediated effects with antecedent variables* studies that considered the influence of school and environmental conditions on principal leadership indicated that principals had a statistically significant effect on school processes and, at least indirectly, on student achievement. Statistical methods in these studies included multiple regression, structural equation modeling, multivariate analysis of variance and variance decomposition, and discriminant analysis. Hallinger and Heck commended these studies for investigating the complex relationship with appropriate sophisticated analytical techniques.

Hallinger and Heck (1996) concluded, "Model type makes a difference in what is found" regarding principal effects on student achievement (p. 37). The 15-year period included in the study represented a gradual shift in the research from simple direct-effects studies to more complex models (Hallinger & Heck, 1996). The earlier direct effects studies, with simplified research designs that failed to consider the complex relationship between principal leadership and student achievement, found nonexistent or weak effects of principal leadership. The later indirect effects studies, with stronger research designs and more powerful statistical methods, found more positive effects of principal leadership on student achievement. The most consistent findings from the studies reviewed indicated that principals exert the greatest effect on student achievement indirectly by framing, conveying, and sustaining the school's purposes and goals. The authors concluded that these findings demonstrated the need for future research to consider

school conditions and context when researching principal effects on student achievement (Hallinger & Heck, 1996).

Witziers, Bosker, and Krüger (2003) experienced similar findings in their meta-analysis of 37 multinational direct effects studies between 1986 and 1996. The researchers focused on the effect size of principal leadership on student achievement, as well as the factors that might account for this effect size (DeMaeyer, Rymenans, VanPetegem, Bergh, & Rijlaarsdam, 2006). The meta-analysis included three separate analyses. First, the researchers analyzed the results from all studies simultaneously. Findings from this analysis indicated that principals have a positive and significant, although very small, effect on student achievement. Second, the authors analyzed the results only from the studies that used a single instrument, treating leadership as a one-dimensional concept. Findings from this analysis indicated that principals do not have a significant effect on student achievement. Third, the authors analyzed the results from studies that used a multi-dimensional concept of leadership, analyzing the relationship between specific leadership behaviors from Hallinger's Principal Instructional Management Rating Scale (PIMRS) and effect size. Findings from this analysis indicated that a positive relationship existed between four leadership behaviors (supervision and evaluation; monitoring; visibility; defining and communicating a school's mission) and effect size. Like Hallinger and Heck (1996), Witziers et al. concluded that research design matters. The authors argued that future principal effects research should use reciprocal models that consider context and intermediate factors (Witziers et al., 2003).

Marzano, Waters, and McNulty (2005) conducted another major meta-analysis of 69 principal leadership studies and challenged previous research findings that principals have no, or very little, effect on student achievement. Unlike previous meta-analyses, Marzano et al. did not classify the studies as direct effects studies or indirect effects studies. Marzano et al. found an average effect size of .25 between principal leadership and student achievement. This effect size was much higher than the effect size of .02 that Witziers et al. (2003) found. Marzano et al. argued that three reasons accounted for the disparate findings. First, Witziers et al. focused their research on schools in various countries. Of the 37 studies in Witziers et al.'s meta-analysis, 25 were taken from the study of the International Association for the Evaluation of Educational Achievement on reading literacy in 25 countries. The average effect size without these 25 studies was found to be .11 (Witziers et al., 2003). Marzano et al. only included studies from the United States in their meta-analysis. Second, Marzano et al. excluded conceptual and statistical outliers when computing average effect sizes. The average effect size would have been lower than .25 if outliers were included in the computation. Witziers et al. included outliers in their computation of the effect size of specific leadership behaviors. Third, Marzano et al. used reliabilities from the individual studies to correct for attenuation in the measures of principal leadership and student achievement. Marzano et al. noted that they likely would have found a lower effect size if they did not correct for attenuation.

Effect sizes from the individual studies in Marzano et al.'s (2005) meta-analysis ranged from -.03 to .62. The researchers investigated eight moderator variables as potential causes of this wide range: study quality, school level, subject area, inference

level for effect size, achievement metric, ethnicity, community type, and socioeconomic status. Of these eight moderator variables, they only found a possible significant relationship in study quality. They tested this relationship by rating the quality of each study's methodology as high, medium, or low. Findings from this analysis indicated a positive relationship between the quality of a study and the strength of the correlation. High quality studies had an average correlation of .31, medium quality studies had an average correlation of .23, and low quality studies had an average correlation of .17 (Marzano et al., 2005). This result is an important finding because it provides quantifiable support for the assertions of previous researchers that research design matters.

Marzano et al. (2005) attempted to provide more practical data for principals than simply an average correlation. They analyzed the 69 studies in their meta-analysis and identified 21 principal responsibilities and their corresponding average correlation with student academic achievement. The 21 responsibilities were: Affirmation (.19); Change Agent (.25); Contingent Rewards (.24); Communication (.23); Culture (.25); Discipline (.27); Flexibility (.28); Focus (.24); Ideals/Beliefs (.22); Input (.25); Intellectual Stimulation (.24); Involvement in Curriculum, Instruction, and Assessment (.20); Knowledge of Curriculum, Instruction, and Assessment (.25); Monitoring/Evaluating (.27); Optimizer (.20); Order (.25); Outreach (.27); Relationships (.18); Resources (.25); Situational Awareness (.33); and Visibility (.20). Based on the descriptions of each responsibility provided by Marzano et al. (2005), only the responsibilities of communication, order, and visibility involved any direct interaction between the principal and students. The remaining 18 responsibilities involved the principal affecting student

achievement through mediators, such as teachers. In sum, Marzano et al.'s (2005) findings conflicted with previous findings regarding the size of principal effects on student achievement; Marzano et al. found a larger average effect size of principal leadership on student achievement. At the same time, Marzano et al.'s findings coincided with previous findings regarding the primarily indirect nature of principal effects on student achievement.

Behavior: Direct Principal Effects on Student Achievement

A growing body of research (Gentilucci & Muto, 2007; Silva et al., 2011) has recently emerged supporting the notion that principals can have a significant direct effect on student achievement. Many previous studies focused on the relationship between school-level variables, including school mission, school culture, school size, and highly qualified teachers in classrooms, and student achievement. Other previous studies investigated the principal's role in shaping the educational environment without identifying student achievement as a dependent variable. Also, scholars have argued that basic statistical models used in existing research failed to adequately measure the complexity of the relationship between principal behaviors and student achievement (Hallinger & Heck, 1996). As a result, the notion that principals have a direct effect on student achievement has been largely abandoned and replaced with a focus on the indirect effects of principals on student achievement.

Gentilucci and Muto (2007) studied the potential direct effects of principal leadership on student achievement. The researchers criticized existing principal effects

research for failing to consider the perspective of students. Citing mounting pressure on principals to raise test scores as a result of No Child Left Behind, they investigated what students perceived to be effective actions by their principals that affected their academic achievement. They sought to answer two questions: (1) Do students perceive that leadership behaviors of principals have a direct effect on their (students') learning and academic achievement? and (2) If yes, what specific leadership behaviors do students perceive most positively influence learning and academic achievement in their schools? Data were collected from 39 eighth graders randomly selected from three different middle schools in three different school districts in California. Students consistently reported that they believed principals "can and do directly influence learning and academic achievement in their schools by engaging in certain student- and instructionally-focused behaviors" (p. 228). Several direct instructional leadership behaviors were identified as effective, including approachability, interactive classroom observations and/or visitations, and acting more like a teacher-principal than an administrator-principal. Students also indicated that less effective principal behaviors focused on issues tangential to their academic success, including enforcing the dress code, making routine announcements, talking with teachers, and conducting meetings (Gentilucci & Muto, 2007). These findings are valuable because they provide a student perspective of how principals can directly affect student achievement. Findings are limited, however, by the small sample size (39 students), as well as the fact that the students were all in one grade. Future research should attempt to replicate these findings with a larger population of students from various grades.

Silva et al. (2011) built upon the findings of Gentilucci and Muto (2007) with an experimental study investigating whether one-on-one discussions between a principal and a student can directly affect the student's subsequent score on a standardized reading test. The subjects of the study were 41 non-proficient eighth grade students from a large suburban middle school in Pennsylvania. Twenty students were randomly assigned to the experimental condition, and 21 students were randomly assigned to the control condition. Students in the experimental condition met twice with the principal in the month preceding the 2009 PSSA reading test. The first meeting was a 15 minute achievement-based discussion that focused on six components: (1) introductions and general discussion to put the student at ease, (2) a statement of the school mission and the principal's high expectations for students' improved reading performance, (3) a review of the student's individual achievement report from the seventh grade 2008 PSSA Reading Test, including identification of the student's overall level of performance, areas of relative strength, and areas of relative need, (4) identification of the Pennsylvania Value Added Assessment System (PVAAS) projected score for the student, (5) collaboratively setting a goal for the student's percentile score on the eighth grade 2009 PSSA Reading Test, and (6) expressions of appreciation, support, and encouragement to the student by the principal. The second meeting was a follow-up discussion within the week preceding the 2009 PSSA Reading Test.

Students in the control condition met with the principal twice during the month following the 2009 PSSA Reading Test. The first meeting was a 15 minute achievement-based discussion that focused on five components: (1) introductions and general discussion to put the student at ease, (2) a statement of the school mission and the

principal's high expectations for students' improved reading performance, (3) a review of the student's individual achievement report from the seventh grade 2008 PSSA Reading Test, including identification of the student's overall level of performance, areas of relative strength, and areas of relative need, (4) collaboratively setting a goal for the student's achievement on high school reading assessments, and (5) expressions of appreciation, support, and encouragement to the student by the principal. The second meeting was a follow-up discussion to the previous meeting.

The study found that the principal's discussions with students in the experimental condition had a significant effect on their gains on the 2009 PSSA Reading Test. Students in the experimental condition achieved a mean net gain of 2.60 percentile points above their PVAAS predicted scores. Students in the control condition achieved a mean net loss of 2.00 percentile points below their PVAAS predicted scores. Silva et al. (2011) argued, "These findings of a significant and direct principal effect should open a new chapter in the literature of principal effects that has long concluded only mediated and indirect principal effects on student outcomes" (p. 46). Findings from this study were strengthened by the researcher's use of an experimental design. At the same time, a small population (41 students), as well as the fact that the students were all white and middle class eighth graders, limits the generalizability of the study's findings. Regardless of these limitations, this study provides a great value to principals because it deals specifically with improving student achievement on high-stakes measures of accountability. Silva et al.'s (2011) findings, along with the findings of Gentilucci and Muto (2007), challenged the long-held belief that principals can only have an indirect

effect on student achievement. Evidence now exists that principals can have a direct effect on student achievement in their schools.

Self-Efficacy

Extant research supports both direct and indirect effects of principal leadership on student achievement. Research fails to identify the "why;" why do some principals tend to behave in more indirect ways while other principals tend to behave in more direct ways? Tschannen-Moran and Gareis (2004) argued that the answer to that question lies in the thought process of principals, noting, "what principals do is a direct consequence of what and how they think" (p. 573). They described self-efficacy as "one promising, but largely unexplored avenue to understanding principal motivation and behavior" (Tschannen-Moran & Gareis, 2004, p. 573). Findings from the limited existing principal efficacy studies indicated that self-efficacy beliefs are excellent predictors of principal behavior (Tschannen-Moran & Gareis, 2004). Despite the fact that Bandura's Social Cognitive Theory is often used as a theoretical framework in this body of research, studies have consistently failed to investigate self-efficacy within the complete construct of triadic reciprocality. Two studies (DeMoulin, 1992; Smith, Guarino, Strom, & Adams, 2006) investigated the relationship between personal/environmental factors and self-efficacy in isolation of any specific behaviors. Another study (Leithwood & Jantzi, 2008) investigated the relationship between all three components of Bandura's construct, but only considered indirect principal behaviors.

DeMoulin (1992) explored the relationships among motivation, confidence, and stress as predictors of principals' perceived self-efficacy. Data were collected using survey results from 212 out of 375 randomly selected elementary and secondary principals. The researchers found a significant difference in efficacy level for each of the three levels of principal. Significant differences were reported between elementary school and middle school principals and between elementary school and high school principals. No significant difference was reported between middle school and high school principals.

DeMoulin's (1992) study also found that elementary school principals with high self-efficacy tended to have minimal additional duties and use a minimal number of sick/personal days. Elementary school principals with moderate self-efficacy tended to have a school population that was larger than desired, a high number of additional duties, and a high number of sick/personal days used. Elementary school principals with low self-efficacy tended to have lower than desired salary, a school population that was larger than desired, a high number of additional duties, and the most sick/personal days used. Middle school principals with high self-efficacy tended to have an increased education level, a low number of additional duties, and a minimal number of sick/personal days used. Middle school principals with moderate self-efficacy tended to have lower than desired salaries, a school population that was larger than desired, a high number of additional duties, and a high number of sick/personal days used. Middle school principals with low self-efficacy tended to have the lowest salaries, a school population that was larger than desired, longer travel time to and from work, the highest number of additional duties, and the highest number of sick/personal days used. High school

principals with high self-efficacy tended to have a higher education level, a low number of additional duties, and a low number of sick/personal days used. High school principals with moderate self-efficacy tended to have a longer travel time to and from work, a high number of additional duties, and a high number of sick/personal days used. High school principals with low self-efficacy tended to be older, have more experience, have lower than desired salaries, have a school population that was larger than desired, have a higher number of additional duties than desired, have the highest number of sick/personal days used, and live in a city that was perceived to be too large. This study found significant relationships between several personal and environmental variables and self-efficacy, but failed to investigate whether any relationship existed between the tested personal and environmental variables, self-efficacy, and the behavior of principals.

In a similar study, Smith et al. (2006) studied the influence of principal self-efficacy on effective teaching and learning in the school environment. Their study included three research questions. First, is there a relationship between nine demographic variables of the principal or school and principal self-efficacy beliefs? The demographic variables were principal race (Caucasian, minority), gender, years in education, years as a principal at a particular school, total years as a principal, academic degree of the principal (master's, specialist, or doctorate), number of students enrolled at principal's school, percent of students on free/reduced lunch, and location of the school (urban, suburban, rural). Second, are there significant differences between perceived beliefs and actual practices of principals? Third, what is the outcome expectancy for principals to facilitate effective teaching and learning at their respective schools?

Smith et al. (2006) used Tschannen-Moran's and Gareis' (2004) Principal Self-Efficacy Scale (PSES) to collect data from 284 principals representing elementary, middle, and high schools in 12 states. The PSES measures self-efficacy in three areas: management, instructional leadership, and moral leadership. Higher self-efficacy in management was reported for principals working at schools with a higher proportion of students receiving free/reduced lunch. Higher self-efficacy in instructional leadership was reported for females, principals working at schools with a higher proportion of students receiving free/reduced lunch, and principals working in larger schools. Additionally, the amount of reported time devoted to management was lower for principals with more experience. The amount of reported time devoted to instructional leadership was higher for females and principals working in schools with a higher proportion of students receiving free/reduced lunch. A total of 226 respondents indicated their efforts to facilitate an effective teaching and learning environment were productive and worthwhile, 56 respondents indicated their efforts were worthwhile but hampered by policy or other impediments, and two respondents indicated their efforts make little difference and leave them feeling discouraged and/or depressed.

Similar to DeMoulin (1992), Smith et al. (2006) identified a significant relationship between several personal and environmental factors and principal self-efficacy. While the study asked principals about whether they felt their behaviors were affecting the teaching and learning environment, it stopped short of linking environment and self-efficacy to the behavior component of Bandura's Social Cognitive Theory. Instead, the study linked environment and self-efficacy to principals' outcome expectancy regarding unspecified behaviors. DeMoulin's (1992) and Smith et al.'s

(2006) findings support Bandura's assertion that a relationship exists between self-efficacy and certain environmental factors, but both studies failed to consider the role of any specific behavior as a determinant in a triadic relationship.

Leithwood and Jantzi (2008) investigated the significance of district leadership and district conditions as antecedents to principal efficacy, as well as the effects of principal efficacy on student achievement, as moderated through indirect leadership behaviors. Specifically, the second component of the study "examined the influence of leader efficacy on leader behavior, on the school and classroom conditions that we judged to have the greatest impact on student learning and on student learning itself" (Leithwood and Jantzi, 2008, p. 509). This study nearly considered the complete triadic reciprocality as described by Bandura, except that it treated the relationship between environmental factors and self-efficacy as unidirectional, not reciprocal. Four dimensions of leader behavior were measured: setting directions, developing people, redesigning the organization, and managing the instructional program. Student achievement was measured using a 3-year average of student performance on state math and language standardized tests. The influence of several personal characteristics on leader efficacy was also measured. The personal characteristics were leader race/ethnicity, gender, years of experience as an administrator, and years of experience in the current school.

Findings indicated significant relationships between leader self-efficacy and the four measured dimensions of leadership – setting directions (.40), developing people (.25), redesigning the organization (.31), and managing the instructional program (.31). Findings also indicated significant relationships between leader self-efficacy and school conditions (.38) and classroom conditions (.30). The study did not find a significant

relationship between principal self-efficacy and student achievement. None of the three years measured, or the three-year average, was found to be significantly related to principal self-efficacy. Several variables, including district size, school size, school level, and number of principals in the school over the last ten years were found to be significant moderators in the relationships between efficacy and classroom and school conditions, as well as student achievement. This study is limited in that it only considered indirect leadership behaviors. Findings should not be misinterpreted as indicating there is no significant relationship between principal self-efficacy and student achievement. As previous researchers have argued (see Hallinger & Heck, 1996; Witziers et al., 2003), model type makes a difference in what is found. To gain a more complete understanding of these relationships, similar research should be conducted with both indirect and direct principal behaviors.

Environment

Many researchers have stressed the importance of considering the mediating role of school and personal characteristics in studies of principal effects (Bossert, Dwyer, Rowan, & Lee, 1982; Bridges, 1982; DeMaeyer et al., 2007; Hallinger, Bickman, & Davis, 1996; Hallinger, 2005; Hallinger & Heck, 1996; Hallinger & Heck, 1998; Leithwood & Mascall, 2008; Mulford & Silins, 2011; Sammons, Gu, Day, & Ko, 2011; Witziers et al., 2003). The call to consider environmental influences on principal behavior could be heard as early as 1982, when Bossert et al. noted, "reviews of successful schools literature intimate that principals must find the style and structures

most suited to their own local situation… the same conclusion can be reached by a careful examination of quantitative studies of effective schools… some of these contain interaction effects which suggest that certain principal behaviors have different effects in different instructional settings" (p. 38). Existing research that considered school and personal characteristics often failed to simultaneously consider the role of personal agency (self-efficacy), the central tenet of Bandura's social cognitive theory.

Goldring, Huff, May, and Camburn (2007) investigated the relationship between environmental context, individual attributes, and how much time principals allocate to major realms of responsibility. Their study researched three questions. First, how do principals allocate their attention across major realms of school responsibility? Second, to what extent do principals in different contexts emphasize different realms of responsibility? Third, to what extent do individual attributes affect how principals allocate their attention across major realms of school responsibility? The researchers collected data from 46 principals and 2,070 teachers in one urban, southeastern school district. The principals participated in surveys and daily logs, and the teachers participated in surveys. The daily logs measured how much time principals allocated each day to nine areas of responsibility: building operations; finances and financial support for the school; community or parent relations; school district functions; student affairs; personnel issues; planning/setting goals; instructional leadership; and professional growth. The principal surveys measured three areas of personal characteristics: knowledge (standards-based reform, effective teaching and learning, developing a school learning environment, monitoring instructional improvement, communication, and team building), background characteristics (number of years experience in school leadership,

gender) and professional development. Organizational context variables included students' level of engagement, teacher academic press, percentage of disadvantaged students for each school, and number of students in each school.

The researchers used the principals' reported time allocated to the nine areas of responsibility to group the principals into three clusters: eclectic principals (17 principals), instructional leaders (21 principals), and student-centered leaders (8 principals). Eclectic principals distributed their time more evenly across the nine areas of responsibility than the other two groups of principals. Instructional leaders spent the most time on instructional leadership, community/parent relations, and student affairs. Student-centered leaders spent the most time on student affairs. No principal characteristics (knowledge, years of experience, professional development, gender) were found to relate to the grouping of principals into the three clusters. The data analysis of school characteristics found that eclectic principals were more likely to come from schools with higher academic press, higher student engagement, and lower percentages of disadvantaged students.

The researchers supported their decision to only study schools in one school district by arguing that the individual schools have differing socioeconomic status, teacher expectations, and student engagement. One could argue, however, that the generalizability of findings from this study is limited by the fact that the entire sample was drawn from one school district. Despite the diversity among the various schools in the district, it is not unreasonable to expect common school cultural elements to be shared among all schools and principals in a single school district. Findings from this study may also be limited in that the researchers only investigated a limited number of school and

personal characteristics. Finally, this study investigated the relationship between school (environment) and personal characteristics and principal behavior without considering the role of personal agency (self-efficacy), the central tenet of Bandura's social cognitive theory.

Hallinger, Bickman, and Davis (1996) conducted a more thorough study that included student reading achievement as an additional dependent variable. Their research "examined relations between selected school context variables (student socioeconomic status, parental involvement, and principal gender), principal instructional leadership (principal activity in key dimensions of the school's educational program), instructional climate (school mission, opportunity to learn, teacher expectations), and student reading achievement" (p. 527). The researchers found statistically significant relationships between parental involvement and principal leadership, student socioeconomic status and principal leadership, and gender (female) and principal leadership. Regarding student reading achievement, the authors found that principals have no significant direct effect on student achievement. Findings indicated that principals affect student achievement through intervening school climate variables. Findings from this study indicated that school and personal characteristics are related to principal leadership, but the results are limited in three ways. First, generalizability of the findings pertaining to school and principal characteristics is limited by the fact that the researchers only examined three variables (student socioeconomic status, parental involvement, and principal gender). Second, the researchers treated the relationships between school and principal variables, instructional leadership, school climate, and student achievement as linear instead of reciprocal, as suggested by Bandura. The linear treatment makes it difficult to identify

whether some school variables, such as parental involvement, affect principal instructional leadership, or whether the relationship works in reverse. Third, the researchers failed to consider self-efficacy as a mediating variable in the relationship between school and principal characteristics and principal leadership.

CHAPTER III

Methodology

Extant research has focused on identifying predictors of self-efficacy, but has failed to adequately explore the relationship between self-efficacy and specific principal behaviors. Additionally, extant research has failed to study principal self-efficacy within the complete reciprocal construct of Bandura's (1986) Social Cognitive Theory. The purpose of this study was to gain insight into current principals' beliefs and behaviors in an attempt to identify the driving forces behind principal behaviors related to affecting student achievement.

Data collected from public school principals in the state of Pennsylvania were used to investigate the following research question:

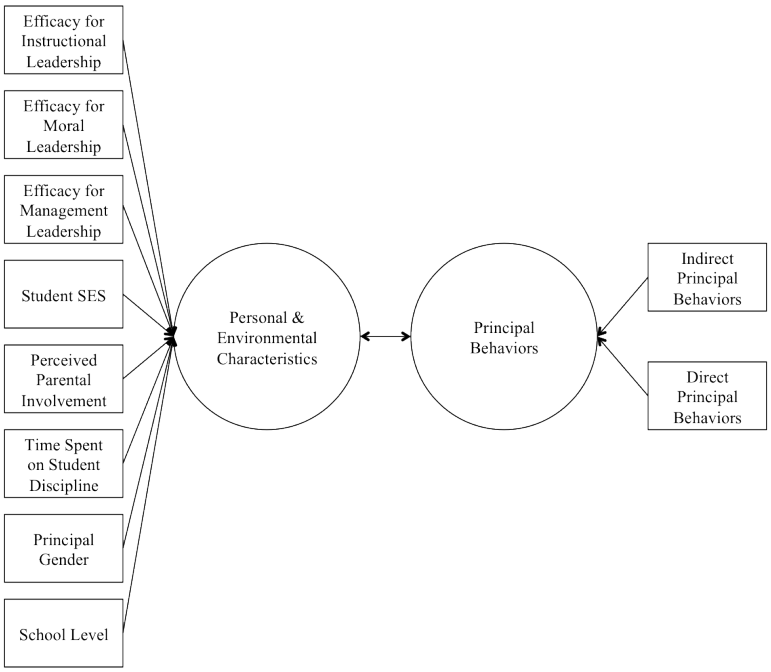
1. Is there a relationship between principals' self-efficacy (instructional leadership, management leadership, moral leadership) and school and personal characteristics (student socioeconomic status, perceived parental involvement, time spent of student discipline, principal gender, school level), and behaviors related to indirectly and directly affecting student achievement?

Overview of Study Design

This study used Canonical Correlation Analysis (CCA) to explore the relationship between principals' self-efficacy and school and personal characteristics, and behaviors related to affecting student achievement (see Figure 2). Two groups of variables were investigated. The first group of variables was classified into two subgroups: self-efficacy

variables and school and personal characteristics variables. The self-efficacy subgroup included the following variables: efficacy for instructional leadership, efficacy for moral leadership, and efficacy for management. The school and personal characteristics subgroup included the following variables: student socioeconomic status, perceived parental involvement, time spent on student discipline, principal gender, and school level. The second group of variables for this study included indirect principal behaviors and direct principal behaviors.

Figure 2
Illustration of Canonical Correlation Study Design



Participants

The population for this study consisted of all public elementary, middle, and high school principals in the state of Pennsylvania as identified by the Pennsylvania

Department of Education on January 4th, 2011. The population did not include charter school principals. Also, given the unique organizational structure and size of the district, as well as the previous experiences of researchers at Lehigh University in securing permission for research, principals from the School District of Philadelphia were not included in the population for this study. The population of all public school principals (excluding charter schools and the School District of Philadelphia) was 2,600 for the most recent year of reporting (Pennsylvania Department of Education, 2012).

The minimum sample size to achieve reliability in Canonical Correlation Analysis is contested among scholars. Barcikowski and Stevens (1975) found using the Monte Carlo method that the number of subjects per variable necessary for accurate interpretation of the two largest canonical correlations ranges from 42:1 to 68:1. Barcikowski and Stevens (1975) also found that a smaller ratio of 20:1 is sufficient for accurate interpretation of only the largest canonical correlate. Other scholars have recommended more conservative ratios. Marascuilo and Levin (1983) recommended only that the ratio of subjects to variables be greater than 10:1. Thorndike (1978) offered two rules regarding sufficient sample size. First, the sample size should be at least 50, plus 10 times the number of variables. Second, the sample size should be equal to 50 plus the square of the number of variables. This study aimed for 200 participants, satisfying the minimum recommendations of Barcikowsi and Stevens (1975), Marascuilo and Levin (1983), and Thorndike (1978).

Simple random sampling was used to identify 700 principals for the sample group, allowing for a conservative 29% response rate to achieve the desired minimum of 200 completed surveys. First, a list of all current public school principals in the state of

Pennsylvania was obtained from the Pennsylvania Department of Education. Second, the list was alphabetized by school district name. Third, all principals from the School District of Philadelphia were removed from the list. Fourth, a table of random numbers was utilized to identify 700 schools and their corresponding principals for the sample group. Out of the 700 schools included in the sample, 14 were either closed or shared a principal with another school included in the sample. E-mail addresses could not be acquired for an additional five principals. The survey was sent to 681 principals. Delivery failure notifications were returned from 29 principals, reducing the actual sample to 652 principals.

Survey Instrument

The Principal Efficacy, Environment, and Behavior Scale (PEEBS), designed by the researcher, was used to collect data on principals' self-efficacy, school and personal characteristics, and behaviors related to affecting student achievement (Appendix A).

Section 1. The first portion of the survey instrument collected demographic data, including principal gender, school level, student socioeconomic status, perceived parental involvement, and time spent on student discipline. Principal gender, school level, and student socioeconomic status data were collected through multiple choice survey items. Perceived parental involvement and time spent on student discipline data were collected through a five-point Likert scale. The demographic questions were developed based on findings of significant relationships between the demographics and principal efficacy in

extant research (see Nye, 2008; Santamaria, 2008). Data collected from this portion of the PEEBS related to the environmental component of Bandura's model.

Section 2. The second portion of the Principal Efficacy, Environment, and Behavior Scale used Tschannen-Moran and Gareis' (2004) Principal Sense of Efficacy Scale (PSES) to collect data on principals' perceived self-efficacy. Tschannen-Moran and Gareis (2004) adapted the PSES from Tschannen-Moran and Hoy's (2001) Teacher Sense of Efficacy Scale (TSES). Both the TSES and PSES were developed in accordance with recommendations outlined by Bandura (2006) in his *Guide for Constructing Self-Efficacy Scales*. Bandura emphasized the contextualized nature of human behavior and self-efficacy beliefs. Accordingly, the directions on the PSES ask participants to "please respond to each of the questions by considering the combination of your current ability, resources, and opportunity to do each of the following in your present position" (Tschannen-Moran and Gareis, 2004, p. 578). Additionally, each item on the PSES shares a common sentence stem: "In your current role as principal, to what extent can you…" (Tschannen-Moran & Gareis, 2004, p. 579). Participants respond to each item on the PSES using a nine-point Likert scale (1 = None at All, 3 = Very Little, 5 = Some Degree, 7 = Quite a Bit, 9 = A Great Deal). Data collected from the second portion of the PEEBS related to the personal component of Bandura's model.

After using the PSES to collect data from 544 public school principals from the state of Virginia, Tschannen-Moran and Gareis (2004) used principal axis factor analysis to identify three factors: efficacy for instructional leadership, efficacy for management, and efficacy for moral leadership. Table 1 presents the three factors, corresponding survey items, and factor loadings. Tschannen-Moran and Gareis (2004) tested the

construct validity of their instrument by correlating it to existing constructs. In alignment with existing constructs, the PSES' measurement of principal efficacy was significantly negatively related to work alienation (r = -.045, $p < 0.01$) and significantly positively related to trust in teachers (r = 0.42, $p < 0.01$) and trust in students and parents (r = 0.47, $p < 0.05$).

Santamaria (2008) conducted a factor analysis of the PSES in his study of 538 principals in the state of California. Santamaria (2008) found that the six efficacy for instructional leadership items and four of the six efficacy for moral leadership items loaded onto factor one, while the two remaining efficacy for moral leadership items loaded onto factor three. In an attempt to remain consistent with the findings of Tschannen-Moran and Gareis (2004), Santamaria (2008) forced the four efficacy items for moral leadership from factor one onto factor three. Nye (2008) also conducted a factor analysis of the PSES in his study of 289 principals in the state of Texas. Similar to Santamaria's (2008) study, Nye (2008) found that the efficacy for instructional leadership and efficacy for moral leadership items did not neatly fit into two distinct factors. Nye (2008) found that five of the six efficacy items for instructional leadership and one of the six efficacy items for moral leadership loaded onto one factor, while the remaining one efficacy item for instructional leadership and the remaining five efficacy items for moral leadership loaded onto a separate factor. Additionally, two efficacy items for instructional leadership and one efficacy item for moral leadership loaded onto both factors. Similar to Santamaria (2008), Nye (2008) adopted the factor structure of Tschannen-Moran and Gareis (2004), despite the findings from his own factor analysis.

Table 1
Principal Sense of Efficacy Scale – Factors, Related Survey Items, and Factor Loadings Tschannen-Moran and Gareis (2004)

Factors and Related Survey Items	Factor 1	Factor 2	Factor 3
Efficacy for Management			
Handle the time demands of the job	0.82		
Handle the paperwork required of the job	0.73		
Maintain control of your own daily schedule	0.70		
Prioritize among competing demands of the job	0.63		
Cope with the stress of the job	0.57		
Shape the operational policies and procedures that are necessary to manage your school	0.53		
Efficacy for Instructional Leadership			
Motivate teachers		0.81	
Generate enthusiasm for shared vision for the school		0.79	
Manage change in your school		0.67	
Create a positive learning environment in your school		0.64	
Facilitate student learning in your school		0.62	
Raise student achievement on standardized tests		0.45	
Efficacy for Moral Leadership			
Promote acceptable behavior among students			0.78
Promote school spirit among a large majority of the student population			0.71
Handle effectively the discipline of students in your school			0.59
Promote a positive image of your school with the media			0.56
Promote the prevailing values of the community in your school			0.51
Promote ethical behavior among school personnel			0.43

Section 3. The third portion of the survey instrument collected data on principals' actual indirect and direct behaviors related to student achievement. Questions in this portion of the survey used a sentence stem similar in structure to the PSES ("In your current role as principal, to what extent do you…"). Also similar in structure to the PSES, participants responded to items in this portion of the survey using a nine-point Likert scale (1=None at All, 3=Very Little, 5=Some Degree, 7=Quite a Bit, 9=A Great Deal). Thirty-eight questions from this portion of the survey were based on findings

from Marzano et al.'s (2005) meta-analysis of 69 principal leadership studies. Table 2 presents the 21 principal responsibilities and their corresponding average correlations with student academic achievement that Marzano et al. (2005) analyzed from the 69 studies in their meta-analysis. Several of these items were used in recent extant research that identified specific indirect and direct behaviors that affect student achievement (see Gentilucci & Muto, 2007; Marzano et al., 2005; Silva et al., 2011). Data collected from this portion of the PEEBS related to the behavior portion of Bandura's model.

Table 2
Average Effect Sizes of 21 Leadership Responsibilities

Leadership Responsibility	Effect Size
Culture	.29
Order	.26
Discipline	.24
Resources	.26
Curriculum, Instruction, Assessment	.16
Focus	.24
Knowledge of Curriculum, Instruction, Assessment	.24
Visibility	.16
Contingent Rewards	.15
Communication	.23
Outreach	.28
Input	.30
Affirmation	.25
Relationship	.19
Change Agent	.30
Optimizer	.20
Ideals/Beliefs	.25
Monitors/Evaluates	.28
Flexibility	.22
Situational Awareness	.33
Intellectual Stimulation	.32

In addition to identifying the 21 leadership responsibilities, Marzano et al. (2005) identified 66 specific leadership practices that have a statistically significant correlation

to student achievement. Table 3 presents the 38 leadership practices that corresponded to one of the 11 leadership responsibilities with an effect size greater than or equal to the mean (.25). These items were selected in order to reduce the length of the survey instrument by focusing on the factors identified as having the greatest effect size on student achievement.

Three additional questions from this portion of the survey were based on findings from Silva et al.'s (2011) experimental study investigating whether one-on-one discussions between a principal and non-proficient student can directly affect the student's subsequent score on a standardized reading test. Principals involved in Silva et al.'s (2011) study consistently demonstrated three behaviors to students in the experimental condition: communicating the school's mission directly to the students, involving the students in monitoring their own academic progress, and communicating high expectations directly to students in achievement-based discussion.

Finally, seven additional questions from this portion of the survey were based on findings from Gentilucci and Muto's (2007) investigation of what students perceived to be behaviors by their principals that affected their academic achievement. Students identified several direct instructional leadership behaviors as effective: cultivating an approachable persona by consistently engaging with students; communicating to students that they are interested in their personal academic challenges and successes; having informal conversations with students about academic achievement; interacting with students during classroom visits; exhibiting teacher behaviors during classroom visits (walking around, giving gentle correction, praise, and encouragement); helping students

with assignments during classroom visits; and knowing what students are studying and helping them with assignments.

Table 3
Leadership Responsibilities and Corresponding Leadership Practices

Leadership Responsibility	Leadership Practices
Affirmation	Systematically and fairly recognize the accomplishments of teachers and staff
	Systematically and fairly recognize and celebrate the accomplishment of students
	Systematically and fairly recognize the failures of and celebrate the accomplishments of the school as a whole
Change Agent	Consciously challenge the status quo
	Lead change initiatives with uncertain outcomes
	Systematically consider new and better ways of doing things
	Consistently attempt to operate at the edge versus the center of the school's competence
Culture	Promote a sense of well being among teachers and staff
	Promote cohesion among teachers and staff
	Develop an understanding of purpose among teachers and staff
	Develop a shared vision of what the school could be like
	Promote cooperation among teachers and staff
Ideals/Beliefs	Possess well-defined beliefs about schools, teaching, and learning
	Share beliefs about school, teaching, and learning with the teachers and staff
	Demonstrate behaviors that are consistent with beliefs
Input	Provide opportunities for teacher and staff input on all important decisions
	Provide opportunities for teachers and staff to be involved in developing school policies
	Use leadership teams in decision-making
Intellectual Stimulation	Keep informed about current research and theory on effective schooling
	Continually expose teachers and staff to cutting-edge research and theory on effective schooling
	Foster systematic discussion regarding current research and theory on effective schooling

(table continues)

Leadership Responsibility	Leadership Practices
Monitor/ Evaluate	Continually monitor the effectiveness of the school's curricular practices
	Continually monitor the effectiveness of the school's instructional practices
	Continually monitor the effectiveness of the school's assessment practices
	Remain aware of the impact of the school's practices on student achievement
Order	Provide and reinforce clear structures, rules, and procedures for teachers and staff
	Provide and reinforce clear structures, rules, and procedures for students
	Establish routines for the effective running of the school that teachers and staff understand and follow
Outreach	Ensure the school complies with all district and state mandates
	Advocate for the school with the community at large
	Advocate for the school with parents
	Advocate for the school with central office
Resources	Ensure that teachers and staff have the necessary materials and equipment
	Ensure that teachers and staff have the necessary professional development opportunities that directly enhance their teaching
Situational Awareness	Make yourself aware of informal groups and relationships among teachers and staff
	Make yourself aware of the issues in the school that have not surfaced but could create discord
	Accurately predict what could go wrong from day to day

Instrument Validity

Delphi Advisory Panel. A panel consisting of three educational leaders with expertise in principal behaviors related to student achievement reviewed the behavior portion of the Principal Efficacy, Environment, and Behavior Scale. The panelists included: Robert O'Donnell, Superintendent of Schools, State College Area School District; Peter Reed, Director of Professional Development, National Association of

Secondary School Principals; and Jack Silva, Assistant Superintendent/Chief Academic Officer, Bethlehem Area School District. Feedback was collected pertaining to the content validity of the specific indirect and direct behaviors. A modified Delphi technique was used to allow each panelist to provide feedback without being influenced by the other panelists (Appendix B).

In the first round of the modified Delphi process, the panelists were asked to label each item included on the behavior portion of the survey instrument as indirect, direct, or both. This was important feedback because Marzano et al. (2005) did not explicitly label the behaviors as indirect or direct in their meta-analysis. Data from the first round of the modified Delphi process was collected using the Expert Review Feedback Form – Round 1 (Appendix C). The expert review panel reached two-thirds consensus in the first round that 33 survey items were indirect behaviors and 13 survey items were direct behaviors. The expert review panel failed to reach two-thirds consensus on two survey items: Develop a shared vision of what the school could be like; Provide and reinforce clear structures, rules, and procedures for students. A member of the expert review panel commented that one of the survey items in question (Develop a shared vision of what the school could be like) was unclear because it did not explicitly state whether it involved students or not. The item was removed from the survey based on this feedback. The expert review panel proposed one new direct principal behavior during the first round: Frequently review and discuss student work progress with students.

Three of the items that received two-thirds agreement in the first round appeared incongruous with the provided definitions of indirect and direct behaviors: Directly involve yourself in helping teachers design curricular activities and address assessment

and instructional issues – originally identified as direct; Ensure that teachers and staff have the necessary materials and equipment – originally identified as direct; Continually monitor the effectiveness of the school's instructional practices – originally identified as direct. In the second round of the modified Delphi process, the three behaviors with questionable identification, as well as the one remaining survey item that failed to receive at least two-thirds consensus (Provide and reinforce clear structures, rules, and procedures for students), were redistributed to the expert review panel, and the panelists were asked to re-identify each behavior and provide their rationale regarding how they identified the behavior. The panelists were also asked in the second round to confirm that the recommended additional direct principal behavior (Frequently review and discuss student work progress with students) was considered to have a direct effect on student achievement. The expert review panel reached two-thirds consensus in the second round that four survey items were indirect behaviors (Provide and reinforce clear structures, rules, and procedures for students; Directly involve yourself in helping teachers design curricular activities and address assessment and instructional issues; Ensure that teachers and staff have the necessary materials and equipment; Continually monitor the effectiveness of the school's instructional practices). The expert review panel reached two-thirds agreement in the second round that one survey item was a direct behavior (Frequently review and discuss student work progress with students). Data from the second round of the modified Delphi process was collected using the Expert Review Feedback Form – Round 2 (Appendix D). Table 4 presents the findings from the completed modified Delphi process.

Table 4
Delphi Advisory Panel Results

Effect	Principal Behaviors
Indirect	Continually expose teachers and staff to cutting-edge research and theory on effective schooling
	Ensure the school complies with all district and state mandates
	Advocate for the school with central office
	Systematically and fairly recognize the failures of and celebrate the accomplishments of the school as a whole
	Accurately predict what could go wrong from day to day
	Demonstrate behaviors that are consistent with beliefs
	Consciously challenge the status quo
	Provide opportunities for teachers and staff to be involved in developing school policies
	Provide opportunities for teacher and staff input on all important decisions
	Promote cohesion among teachers and staff
	Provide and reinforce clear structures, rules, procedures for teachers and staff
	Keep informed about current research and theory on effective schooling
	Consistently attempt to operate at the edge versus the center of the school's competence
	Advocate for the school with parents
	Remain aware of the impact of the school's practices on student achievement
	Continually monitor the effectiveness of the school's assessment practices
	Systematically consider new and better ways of doing things
	Promote cooperation among teachers and staff
	Share beliefs about school, teaching, and learning with the teachers and staff
	Continually monitor the effectiveness of the school's curricular practices
	Make yourself aware of informal groups and relationships among teachers and staff
	Develop an understanding of purpose among teachers and staff
	Lead change initiatives with uncertain outcomes
	Promote a sense of well being among teachers and staff
	Systematically and fairly recognize the accomplishments of teachers and staff
	Advocate for the school with the community at large
	Possess well-defined beliefs about schools, teaching, and learning
	Establish routines for the effective running of the school that teachers and staff understand and follow
	Make yourself aware of the issues in the school that have not surfaced but could create discord
	Foster systematic discussion regarding current research and theory on effective schooling
	Use leadership teams in decision-making
	Ensure that teachers and staff have the necessary professional development opportunities that directly enhance their teaching

(table continues)

Effect	Principal Behaviors
	Cultivate an approachable persona by consistently engaging with students
	Provide and reinforce clear structures, rules, and procedures for students
	Directly involve yourself in helping teachers design curricular activities and address assessment and instructional issues
	Ensure that teachers and staff have the necessary materials and equipment
	Continually monitor the effectiveness of the school's instructional practices
Direct	Exhibit teacher behaviors during classroom visits (walking around, giving gentle correction, praise, and encouragement)
	Communicate high expectations directly to students in achievement-based discussions
	Interact with students during classroom visits
	Communicate the school's mission directly to students
	Know what students are studying and help them with assignments
	Communicate to students that you are interested in their personal academic challenges and successes
	Involve students in monitoring their own academic progress
	Have informal conversations with students about academic achievement
	Systematically and fairly recognize and celebrate the accomplishments of students on an individual basis
	Help students with assignments during classroom visits
	Frequently review and discuss student work progress with students

Pilot Study. The survey instrument was piloted with 16 graduate students in Lehigh University's Educational Leadership Program to gather feedback pertaining to clarity of items and directions and time required to complete the survey (Appendix E). Participants in the pilot study completed the Pilot Study Feedback Form (Appendix F). The pilot study did not yield any feedback pertaining to clarity of items and directions that warranted making any changes to the survey instrument. The average time to complete the survey was 11 minutes.

Procedure

The survey was completed anonymously using the Survey Monkey website. On November 9th, 2012, the principals included in the sample were sent an e-mail explaining the purpose of the study and inviting them to participate (Appendix G). The e-mail also included a link to the survey instrument. On November 15th, 2012 and December 2, 2012, reminder e-mails (Appendix H and Appendix I, respectively) were sent to the entire sample, regardless of whether they already completed the survey, to remind them to complete the survey if they have not already done so. The survey closed on December 7th, 2012, four weeks after the initial e-mail was sent.

Data Analysis

Canonical Correlation Analysis. This study used Canonical Correlation Analysis (CCA) to test the relationship between the two groups of variables (see Figure 1). The use of CCA was appropriate in this study for several reasons. First, the use of CCA minimized the risk of Type I error because the variables were assessed simultaneously as opposed to assessed in many univariate statistical tests (Sherry & Henson, 2005). Second, CCA tested for correlations, not causality. As a result, CCA used two groups of variables commonly referred to as "predictor" and "criterion" variables as opposed to "independent" and "dependent" variables that are commonly used in experimental models. Testing a correlational model was appropriate in this study because Bandura's model emphasizes the reciprocal (bidirectional), not unidirectional, relationships between personal characteristics, environmental characteristics, and behavior. Third, CCA, like

other multivariate tests, tested for the complexity that exists in human behavior. Investigating a complex relationship through a series of isolated univariate methods may have failed to reveal significant multivariate relationships (Sherry & Henson, 2005). Testing a multivariate model allowed for correlations between and within the sets of predictor and criterion variables, and was appropriate in this study because principal behavior is a complex topic with multiple causes and multiple effects.

Data was entered into IBM's SPSS predictive analytics software for analysis. The first stage of data analysis focused on whether a relationship existed between the groups of variables. Wilks' lambda (λ) was used to determine if a significant relationship existed, as well as the magnitude of the relationship. Second, each individual canonical correlation was evaluated to determine if it explained a reasonable amount of variance between the variable sets. The second stage of data analysis focused on identifying which specific variables contributed to the relationship between the groups of variables. Standardized canonical function coefficients, structure coefficients (r_s), and squared structure coefficients (r_s^2) were analyzed to determine the amount of variance each variable contributed to its respective group (Sherry & Henson, 2005).

Missing Data. Missing data existed in the efficacy and behavior portions of the final data set. Table 5 presents the missing data. No single survey item was skipped by more than three percent of the sample. Rubin, Witkiewitz, St. Andre, and Reilly (2007) analyzed the effects of four missing data techniques (listwise deletion, mean substitution, regression, and expectation-maximization) on a single data set. Their research found that mean substitution, regression, and expectation-maximization were all efficient procedures

when there was less than five percent missing data. Missing data points in the current study were imputed with the series mean substitution in SPSS.

Table 5
Missing Data in Final Data Set

Survey Item	Missing Data Points
Efficacy_3	1
Efficacy_4	1
Efficacy_6	1
Efficacy_8	1
Efficacy_11	2
Effiacy_14	1
Effiacy_15	2
Effiacy_18	1
Behavior_6	1
Behavior_8	2
Behavior_9	1
Behavior_10	1
Behavior_13	3
Behavior_15	1
Behavior_16	1
Behavior_17	6
Behavior_19	2
Behavior_27	1
Behavior_29	1
Behavior_30	2
Behavior_32	2
Behavior_35	4
Behavior_36	1
Behavior_38	1
Behavior_39	1
Behavior_40	3
Behavior_43	1
Behavior_47	1
Behavior_48	2

CHAPTER IV

Results

Existing principal effects research presents conflicting findings and is limited by a failure to investigate the complete triadic relationship between principals' perceived self-efficacy (efficacy for management, efficacy for instructional leadership, and efficacy for moral leadership), school and personal characteristics (principal gender, school level, student socioeconomic status, perceived parental involvement, and time spent on student discipline), and principals' behaviors related to indirectly and directly affecting student achievement. The purpose of the current study was to gain insight into current principals' beliefs and behaviors in an attempt to identify the driving forces behind principal behaviors related to affecting student achievement.

Data collected from public school principals in the state of Pennsylvania were used to investigate the following research question:

1. Is there a relationship between principals' self-efficacy (instructional leadership, moral leadership, management) and school and personal characteristics (student socioeconomic status, perceived parental involvement, time spent of student discipline, principal gender, school level), and behaviors related to indirectly and directly affecting student achievement?

Respondents

A total of 240 principals participated in the survey. One participant was not a head principal, and another was a college administrator. Both of these records were

removed from the sample, reducing the total to 238. An additional 31 participants failed to complete the survey, and their incomplete records were deleted from the sample: seven principals skipped the entire efficacy and behavior portions; five principals skipped the entire behavior portion; and 19 principals skipped at least one entire page of the behavior portion. The final number of completed surveys was 207 for a return rate of 32%, based on the sample size of 652 principals.

Frequency statistics pertaining to the personal characteristics and environment variables are presented in Table 6. Female principals made up 45.9% of respondents (n = 95) and male principals made up 53.6% of respondents (n = 111). Principal gender data for the current study's population were not available from the Pennsylvania Department of Education. As a result, the distribution of gender in the respondent group could only be compared against the current study's sample. Chi-square results indicated no significant difference between gender and group (respondent vs. sample), $x^2(2) = .712$, *ns*. Elementary school principals made up 62.3% of respondents (n = 129), Middle School/Junior High School principals made up 15.5% of respondents (n = 32), and High School principals made up 21.3% of respondents (n = 44). Data from the Pennsylvania Department of Education labeled schools as elementary or secondary. As a result, the respondent group could only be compared against the population for the current study using the categories of elementary and secondary. Chi-square results indicated no significant difference between school level (elementary, secondary) and group (respondent vs. population), $x^2(2) = 3.271$, *ns*. Economically disadvantaged students comprised less than 25% for 68 principals (32.9% of respondents), between 25 and 49% for 81 principals (39.1% of respondents), between 50 and 74% for 37 principals (17.9%

of respondents), and greater than 75% for 21 principals (10.1% of respondents). Data pertaining to the percentage of economically disadvantaged students for the sample or population were not available from the Pennsylvania Department of Education. As a result, a Chi-square test could not be conducted for the percentage of economically disadvantaged students variable. Regarding perceived level of parent involvement, two principals perceived that parents were not at all involved in their school (1.0% of respondents), 25 principals perceived that parents were between not at all involved and somewhat involved in their school (12.1% of respondents), 75 principals perceived that parents were somewhat involved in their school (36.2% of respondents), 70 principals perceived that parents were between somewhat involved and very involved in their school (33.8% of respondents), and 34 principals perceived that parents were very involved in their school (16.4% of respondents). One-hundred-twenty-six principals reported spending less than two hours each day on student discipline (60.9% of respondents), 71 principals reported spending two to three hours each day on student discipline (34.3% of respondents), six principals reported spending four to five hours each day on student discipline (2.9% of respondents), three principals reported spending six to seven hours each day on student discipline (1.4% of respondents), and one principal reported spending eight or more hours on student discipline (0.5% of respondents).

Table 6
Frequency Statistics: Personal Characteristics and Environment

Variable	Frequency	% Sample
Gender		
Female	95	45.9
Male	111	53.6
Missing	1	0.5
School Level		
Elementary	129	62.3
Middle/Junior	32	15.5
High	44	21.3
Missing	2	1.0
% of Economically Disadvantaged Students		
0-24%	68	32.9
25-49%	81	39.1
50-74%	37	17.9
75-100%	21	10.1
Perceived Level of Parent Involvement		
1	2	1.0
2	25	12.1
3	75	36.2
4	70	33.8
5	34	16.4
Missing	1	0.5
Time Spent Each Day on Student Discipline		
0-1 Hours	126	60.9
2-3 Hours	71	34.3
4-5 Hours	6	2.9
6-7 Hours	3	1.4
8+ Hours	1	0.5

Factor Analysis

Principal axis factoring with oblimin rotation was used to identify the factors underlying the items in the efficacy and behavior portions of the survey instrument. Oblimin rotation is an oblique method of rotation, meaning it allows the factors to correlate. This is in contrast to orthogonal methods of rotation, which produce factors that are uncorrelated. Costello and Osborne (2005) argued that orthogonal methods of rotation should be used with caution in the social sciences, "since behavior is rarely

partitioned into neatly packaged units that function independently of one another" (3). This argument is particularly pertinent to the current study's context, given the complex nature of principal behavior. The factors identified through the factor analysis were compared against previous research (for the efficacy portion) and against the information gathered from the panel of educational leaders (for the behavior portion) to establish content validity for the instrument.

Factor Analysis – Efficacy. After using the PSES to collect data from 544 public school principals from the state of Virginia, Tschannen-Moran and Gareis (2004) used principal axis factor analysis with oblimin rotation and identified three factors: efficacy for instructional leadership, efficacy for management, and efficacy for moral leadership. For the current study, principal axis factoring with oblimin rotation of the 18 items from the efficacy portion of the PEEBS yielded two factors with eigenvalues exceeding 1.0. Each factor explained 54.75% and 8.86% of the variance respectively, and the two factors together explained a cumulative 63.61% of the variance in the data. The analysis yielded a third factor with an eigenvalue of .898, explaining 4.99% of the variance. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy value was .942. Kaiser (1970) described factor analytic data with a Measure of Sampling Adequacy value exceeding .90 as "excellent" (p. 405). The Bartlett's Test of Sphericity was significant ($p < .001$). Table 7 presents the variance explained by the first three factors. The scree plot suggested two or three factors could be extracted. Although the third factor did not meet the minimum eigenvalue of 1.0 and only explained 4.99% of the variance in the data, it was considered for inclusion in the model because of Tschannen-Moran and Gareis' (2004) findings of three factors.

Table 7
Variance Explained by First Three Factors (N = 207)

Factor	Total Eigenvalue	% of Variance	Cumulative %
1	9.855	54.748	54.748
2	1.595	8.863	63.612
3	.898	4.989	68.600

Two-factor and three-factor solutions were examined. Table 8 presents the 18 survey items, Tschannen-Moran and Gareis' factor findings, and factor loadings after oblimin rotation for the current study's two factor solution. The items that clustered on the same factors suggested that the first factor represented principal efficacy for instructional and moral leadership and the second factor represented principal efficacy for management. All twelve items that Tschannen-Moran and Gareis identified as either instructional leadership or moral leadership behaviors loaded onto the first factor. Factor loadings for items on the first factor ranged from .417 to .855. One item (*Shape the operational policies and procedures that are necessary to manage your school*) that Tschannen-Moran and Gareis identified as an efficacy item for management loaded onto both the first factor (.417) and the second factor (.321), while the remaining five efficacy items for management behaviors loaded onto the second factor. Factor loadings for the five items on the second factor ranged from .305 to .829.

Table 8
Summary of Factor Analysis for Principal Sense of Efficacy Scale – Two-Factor Solution Pattern Matrix (N = 207)

Survey Item	Factor 1	Factor 2	PSES Factor*
Facilitate student learning in your school	.615		IL
Generate enthusiasm for shared vision for the school	.767		IL
Handle the time demands of the job		.806	M
Manage change in your school	.550	.305	IL
Promote school spirit among a large majority of the student population	.808		ML
Create a positive learning environment in your school	.855		IL
Raise student achievement on standardized tests	.512		IL
Promote a positive image of your school with the media	.759		ML
Motivate teachers	.718		IL
Promote the prevailing values of the community in your school	.759		ML
Maintain control of your own daily schedule		.637	M
Shape the operational policies and procedures that are necessary to manage your school	.417	.321	M
Handle effectively the discipline of students in your school	.635		ML
Promote acceptable behavior among students	.768		ML
Handle the paperwork required of the job		.829	M
Promote ethical behavior among school personnel	.470		ML
Cope with the stress of the job		.813	M
Prioritize among competing demands of the job		.821	M

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization (converged in 6 iterations).
Values < .3 Suppressed
*PSES Factor - IL: Instructional Leadership, ML: Moral Leadership, M: Management

Table 9 presents the eighteen survey items, Tschannen-Moran and Gareis' (2004) factor findings, and factor loadings after rotation for the current study's three factor solution. Consistent with the two-factor solution, the six items that Tschannen-Moran and Gareis identified as efficacy for instructional leadership loaded onto the first factor. Also consistent with the two-factor solution, one item that Tschannen-Moran and Gareis

identified as efficacy for management leadership loaded onto both the first factor and the second factor, while the remaining five efficacy for management items loaded onto the second factor. Contrary to the two-factor model, two items *(Handle effectively the discipline of students in your school; Promote acceptable behavior among students*) that Tschannen-Moran and Gareis identified as efficacy for moral leadership loaded onto the third factor, while the remaining four efficacy for moral leadership items loaded onto the first factor.

Based on the findings of the initial factor analysis in the current study, as well as the findings of the factor analyses from previous researchers that were incongruous with Tschannen-Moran and Gareis' (2004) three-factor solution, the current study adopted the two-factor solution (see Santamaria, 2008; Nye, 2008). All twelve items that Tschannen-Moran and Gareis identified as either efficacy items for instructional leadership or efficacy items for moral leadership loaded onto the first factor. Five of the six items that Tschannen-Moran and Gareis identified as efficacy items for management loaded onto the second factor, and one efficacy item for management that cross loaded onto the first and second factors was excluded. Table 10 presents the final factor solution for the efficacy portion of the survey instrument.

Table 9
Summary of Factor Analysis for Principal Sense of Efficacy Scale – Three-Factor Solution
Pattern Matrix (N = 207)

Survey Item	Factor 1	Factor 2	Factor 3	PSES Factor*
Facilitate student learning in your school	.740			IL
Generate enthusiasm for shared vision for the school	.950			IL
Handle the time demands of the job		.766		M
Manage change in your school	.598			IL
Promote school spirit among a large majority of the student population	.648			ML
Create a positive learning environment in your school	.771			IL
Raise student achievement on standardized tests	.561			IL
Promote a positive image of your school with the media	.573			ML
Motivate teachers	.738			IL
Promote the prevailing values of the community in your school	.596			ML
Maintain control of your own daily schedule		.617		M
Shape the operational policies and procedures that are necessary to manage your school	.348	.325		M
Handle effectively the discipline of students in your school			.626	ML
Promote acceptable behavior among students			.744	ML
Handle the paperwork required of the job		.886		M
Promote ethical behavior among school personnel	.413			ML
Cope with the stress of the job		.780		M
Prioritize among competing demands of the job		.786		M

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization (converged in 7 iterations).
Values < .3 Suppressed
**PSES Factor - IL: Instructional Leadership, ML: Moral Leadership, M: Management*

Factor scores were requested from SPSS for the final two efficacy dimensions. The mean of the efficacy for instructional and moral leadership factor scores ($N = 207$) was .00 (standard deviation = .97), with a minimum score of -2.54 and a maximum score of 1.52. The mean of the efficacy for management factor scores ($N = 207$) was .00 (standard deviation = .96), with a minimum score of -3.04 and a maximum score of 1.63.

Table 10
Final Factor Structure for Efficacy Scale
Pattern Matrix (N = 207)

Survey Item	Factor 1	Factor 2
Efficacy for Leadership		
Facilitate student learning in your school	.615	
Generate enthusiasm for shared vision for the school	.767	
Manage change in your school	.550	
Promote school spirit among a large majority of the student population	.807	
Create a positive learning environment in your school	.854	
Raise student achievement on standardized tests	.510	
Promote a positive image of your school with the media	.755	
Motivate teachers	.718	
Promote the prevailing values of the community in your school	.756	
Shape the operational policies and procedures that are necessary to manage your school	.634	
Handle effectively the discipline of students in your school	.756	
Promote ethical behavior among school personnel	.468	
Efficacy for Management		
Handle the time demands of the job		.800
Maintain control of your own daily schedule		.620
Promote acceptable behavior among students		.827
Cope with the stress of the job		.823
Prioritize among competing demands of the job		.834

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization (converged in 6 iterations).

Factor Analysis – Behavior. Principal axis factoring with oblimin rotation of the 48 items from the behavior portion of the PEEBS yielded eight factors with eigenvalues exceeding 1.0, though only two factors explained greater than five percent of the variance. Table 11 presents the variance explained by the first eight factors. The first two factors explained 40.99% and 6.82% of the variance respectively, and the two factors together explained a cumulative 47.81% of the variance in the data. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy value was .938. Kaiser (1970) described factor analytic data with a Measure of Sampling Adequacy value exceeding .90 as "excellent" (p. 405). The Bartlett's Test of Sphericity was significant ($p < .001$). The scree plot suggested two factors should be extracted.

Table 11
Variance Explained by First Eight Factors (N = 207)

Factor	Total Eigenvalue	% of Variance	Cumulative %
1	19.675	40.989	40.989
2	3.274	6.820	47.809
3	2.048	4.266	52.075
4	1.636	3.409	55.485
5	1.462	3.046	58.531
6	1.258	2.621	61.152
7	1.087	2.265	63.417
8	1.068	2.224	65.641

Table 12 presents the 48 survey items, factor loadings after oblimin rotation, and the corresponding identification as either an indirect or direct behavior from the Expert Review Panel. The items that clustered on the same factors suggested that the first factor represented indirect principal behaviors and the second factor represented direct principal behaviors. All 37 items that the Expert Review Panel identified as indirect principal behaviors loaded onto the first factor. One item (*Exhibit teacher behaviors during*

classroom visits – walking around, giving gentle correction, praise, and encouragement) that the Expert Review Panel identified as a direct principal behavior loaded onto the first factor. Factor loadings for the 35 items retained on Factor One ranged from .326 to .860. One item (*Communicate the school's mission directly to students*) that the Expert Review Panel identified as a direct principal behavior was excluded because it cross loaded onto the first and second factors. The remaining seven items that the Expert Review Panel identified as direct principal behaviors loaded onto the second factor. Two of the items that loaded onto the second factor also loaded onto the first factor (*Communicate high expectations directly to students in achievement-based discussions; Interact with students during classroom visits*), but they loaded stronger onto the second factor and thus were retained on the second factor. Factor loadings for the nine items retained on Factor Two ranged from .417 to .867.

Factor scores were requested from SPSS for the two behavior dimensions. The mean of the indirect behavior factor scores ($N = 207$) was .00 (standard deviation = .98), with a minimum score of -3.07 and a maximum score of 1.76. The mean of the direct behavior factor scores ($N = 207$) was .00 (standard deviation = .96), with a minimum score of -2.81 and a maximum score of 2.02.

Table 12
Summary of Factor Analysis for Behavior Portion – Pattern Matrix (N = 207)

	Factor		
Variable	1	2	Expert
Continually expose teachers and staff to cutting-edge research and theory on effective schooling	.524		I
Ensure the school complies with all district and state mandates	.690		I
Advocate for the school with central office	.608		I
Systematically and fairly recognize the failures of and celebrate the accomplishments of the school as a whole	.663		I
Accurately predict what could go wrong from day to day	.495		I
Demonstrate behaviors that are consistent with beliefs	.724		I
Frequently review and discuss student work progress with students		.498	D
Consciously challenge the status quo	.490		I
Cultivate an approachable persona by consistently engaging with students	.431		I
Provide opportunities for teachers and staff to be involved in developing school policies	.516		I
Provide opportunities for teacher and staff input on all important decisions	.635		I
Promote cohesion among teachers and staff	.680		I
Provide and reinforce clear structures, rules, and procedures for teachers and staff	.855		I
Exhibit teacher behaviors during classroom visits (walking around, giving gentle correction, praise, and encouragement)	.526		D
Keep informed about current research and theory on effective schooling	.679		I
Provide and reinforce clear structures, rules, and procedures for students	.781		I
Consistently attempt to operate at the edge versus the center of the school's competence	.452		I
Advocate for the school with parents	.678		I
Remain aware of the impact of the school's practices on student achievement	.860		I
Continually monitor the effectiveness of the school's assessment practices	.755		I
Systematically consider new and better ways of doing things	.622		I
Directly involve yourself in helping teachers design curricular activities and address assessment and instructional issues	.451		I
Promote cooperation among teachers and staff	.676		I

(table continues)

Variable	Factor 1	Factor 2	Expert
Share beliefs about school, teaching, and learning with the teachers and staff	.655		I
Continually monitor the effectiveness of the school's curricular practices	.690		I
Communicate high expectations directly to students in achievement-based discussions	.366	.469	D
Interact with students during classroom visits	.305	.417	D
Ensure that teachers and staff have the necessary materials and equipment	.611		I
Communicate the school's mission directly to students	.366	.423	D
Make yourself aware of informal groups and relationships among teachers and staff	.535		I
Develop an understanding of purpose among teachers and staff	.677		I
Lead change initiatives with uncertain outcomes	.326		I
Continually monitor the effectiveness of the school's instructional practices	.711		I
Know what students are studying and help them with assignments		.710	D
Communicate to students that you are interested in their personal academic challenges and successes		.715	D
Involve students in monitoring their own academic progress		.760	D
Promote a sense of well being among teachers and staff	.649		I
Systematically and fairly recognize the accomplishments of teachers and staff	.503		I
Advocate for the school with the community at large	.604		I
Possess well-defined beliefs about schools, teaching, and learning	.759		I
Have informal conversations with students about academic achievement		.867	D
Systematically and fairly recognize and celebrate the accomplishments of students on an individual basis		.597	D
Help students with assignments during classroom visits		.668	D
Establish routines for the effective running of the school that teachers and staff understand and follow	.778		I
Make yourself aware of the issues in the school that have not surfaced but could create discord	.609		I
Forster systematic discussion regarding current research and theory on effective schooling	.580		I
Use leadership teams in decision-making	.588		I
Ensure that teachers and staff have the necessary professional development opportunities that directly enhance their learning	.609		I

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization (converged in 5 iterations).

Canonical Correlation Analysis

A canonical correlation analysis was conducted using school environment and personal characteristics as the predictor variables and indirect and direct behavior as the criterion variables. For the purpose of this canonical correlation analysis, categorical variables were dummy coded into binary variables. Gender was recoded to Male = 1, Female = 0. Because a relatively small percentage of high school principals participated in the study, the variable of school level was reduced to a binary variable, with Elementary = 1, Secondary (Middle/Junior and High) = 0. Percentage of economically disadvantaged students was dummy coded into three variables, all using 0 as the reference category: (1) EconDisD1 (25-49% = 1, all others = 0); (2) EconDisD2 (50-74% = 1, all others = 0); (3) EconDisD3 (75-100% = 1, all others = 0). Because a relatively small percentage of principals reported spending two or more hours each day on student discipline, the time spent of student discipline variable was reduced to a binary variable; 0-1 hours = 1, 2 or more hours = 0. Perceived level of parent involvement was treated as a continuous variable and not recoded. Table 13 presents descriptive statistics for all of the variables included in the canonical correlation analysis.

Multivariate Normality. Canonical correlation analysis assumes multivariate normality. While there is no accepted test for multivariate normality, it is generally accepted to test each variable for univariate normality (Sherry and Henson, 2005). An examination of the skew and kurtosis values for the non-categorical variables (*Parent involvement; Efficacy for instructional and moral leadership; Efficacy for management; Indirect principal behaviors; Direct principal behaviors*) revealed that each was normally

distributed (skew and kurtosis between -1 and +1). This finding was supported by a visual inspection of the Normal Q-Q Plot for each variable.

Table 13
Descriptive Statistics

Variable	N	Min	Max	Mean	SD	Skewness	Kurtosis
Predictor Variables							
Principal Gender	206	.00	1.00	.54	.50	-.16	-2.00
School Level	205	.00	1.00	.37	.48	.54	-1.73
25-49% Econ. Dis.	207	.00	1.00	.39	.49	.45	-1.82
50-74% Econ. Dis.	207	.00	1.00	.18	.38	1.69	.86
75-100% Econ. Dis.	207	.00	1.00	.10	.30	2.66	5.12
Parent Involvement	206	1.00	5.00	3.53	.94	-.10	-.56
Student Discipline	207	.00	1.00	.39	.49	.45	-1.82
Efficacy for Instructional and Moral Leadership	207	-2.54	1.52	.00	.97	-.54	-.29
Efficacy for Management	207	-3.04	1.62	.00	.96	-.50	-.15
Criterion Variables							
Indirect Principal Behaviors	207	-3.07	1.76	.00	.98	-.58	.34
Direct Principal Behaviors	207	-2.81	2.02	.00	.96	-.39	.09

% Econ. Dis. refers to population of economically disadvantaged students in school; Parent Involvement refers to principals' perceived level of parent involvement in their school

Analysis of Full Canonical Model. The first step of canonical correlation analysis is to evaluate the full canonical model for statistical significance. The most common method used to determine statistical significance on the full canonical model is Wilks's lambda (λ) (Sherry and Henson, 2005). The full model was statistically significant using the Wilks's lambda criterion, $\lambda = .374$, $F(18, 384) = 13.555$, $p < .001$ (see Table 14). Wilks's λ represents the variance unexplained by the model, meaning 1 - λ yields the full model effect size in an r^2 metric. Thus, for the two canonical functions, the r^2 type effect size was .626, which indicates that the full model explained a substantial portion, about 63%, of the variance shared between the variable sets.

Table 14
General Fit of the Full Canonical Model

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.658	10.524	18.00	386.00	.000
Hotellings	1.588	16.850	18.00	383.00	.000
Wilks	.374	13.555*	18.00	384.00	.000
Roys	.605				

*F statistic for WILKS' Lambda is exact

Analysis of Individual Functions. The second step of canonical correlation analysis is to determine which canonical functions should be interpreted. The maximum number of canonical functions extracted in a canonical correlation analysis equals the number of variables in the smallest variable set, predictor or criterion (Sherry & Henson, 2005). The first function represents the maximum correlation between the two groups of variables. Each successive function represents the maximum correlation between the two groups of variables based on the residual variance after all previous functions (Sherry & Henson). In the case of this study, the predictor variable set had nine variables, and the criterion variable set had two variables, so two canonical functions were extracted.

Hair, Anderson, Tatham, and Black (1998) recommended that three criteria be used to decide which canonical functions should be interpreted: (1) level of statistical significance of the function, (2) magnitude of the canonical relationship, and (3) redundancy measure of shared variance. Table 15 presents the level of statistical significance for each function. The first function explained a statistically significant amount of shared variance between the two variable sets, $F(18, 384) = 13.555$, $p < .001$. The second function did not explain a statistically significant amount of shared variance between the two variable sets, $F(8, 193) = 1.361$, $p = .216$.

Table 15
Hierarchal Statistical Significance Tests – Dimension Reduction Analysis

Function	Wilks λ	F	Hypothesis DF	Error DF	Significance
1 to 2	.374	13.555	18.00	384.00	.000
2 to 2	.947	1.361	8.00	193.00	.216

Table 16 presents the magnitude of the canonical relationships for each canonical function. The two functions extracted in the analysis had squared canonical correlations (R_c^2) of .605 and .053, respectively. The squared canonical correlation (R_c^2) shows that function one explained 60.5% of the variance, and function two only explained 5.3% of the remaining variance after the extraction of the first function.

Table 16
Eigenvalues and Canonical Correlations

Function	Eigenvalue	Pct.	Cum. Pct.	Canon Cor. (r_c)	Sq. Cor. (r_c^2)
1	1.532	96.446	96.446	.778	.605
2	.056	3.554	100.000	.231	.053

Tables 17 and 18 present the redundancy measure of shared variance for the first and second canonical functions, respectively. For the first canonical function, the redundancy index for the criterion variate was moderate (.389). The redundancy index for the predictor variate was markedly lower (.122). The low redundancy of the predictor variate was a result of the low shared variance in the predictor variate (.201), not the canonical R^2. For the second canonical function, the redundancy indices for the criterion variate (.019) and the predictor variate (.006) were both quite low.

Table 17
Calculation of Redundancy Indices for First Canonical Function

Variable	Canonical Loading	Canonical Loading Squared	Average Loading Squared	Canonical R^2	Redundancy Index
Predictor Variables					
Principal Gender	.295	.087			
School Level	.173	.030			
25-49% Econ. Dis.	.200	.040			
50-74% Econ. Dis.	-.090	.008			
75-100% Econ. Dis.	-.066	.004			
Student Discipline	.137	.019			
Parent Involvement	-.304	.092			
Efficacy for Instructional and Moral Leadership	-.941	.885			
Efficacy for Management	-.802	.643			
Predictor Variate		1.808	.201	.605	.122
Criterion Variables					
Indirect Principal Behaviors	-.999	.998			
Direct Principal Behaviors	-.537	.288			
Criterion Variate		1.286	.643	.605	.389

Table 18
Calculation of Redundancy Indices for Second Canonical Function

Variable	Canonical Loading	Canonical Loading Squared	Average Loading Squared	Canonical R^2	Redundancy Index
Predictor Variables					
Principal Gender	.026	.001			
School Level	-.229	.052			
25-49% Econ. Dis.	-.036	.001			
50-74% Econ. Dis.	.337	.114			
75-100% Econ. Dis.	.590	.348			
Student Discipline	.406	.165			
Parent Involvement	-.565	.319			
Efficacy for Instructional and Moral Leadership	-.253	.064			
Efficacy for Management	.187	.035			
Predictor Variate		1.099	.122	.053	.006
Criterion Variables					
Indirect Principal Behaviors	.008	.001			
Direct Principal Behaviors	.844	.712			
Criterion Variate		.713	.357	.053	.019

Based on the (1) level of statistical significance of each function, (2) magnitude of the canonical relationships, and (3) redundancy measures of shared variance, only the first function was considered noteworthy in the context of this study.

Interpreting the Canonical Variates. Standardized canonical function coefficients (sometimes referred to as canonical weights) and structure coefficients (sometimes referred to as canonical loadings or structure correlations) were requested in SPSS for each variable. Table 19 presents the standardized canonical function coefficients, structure coefficients, and squared structure coefficients for each variable. Standardized canonical function coefficients represent the magnitude of the contribution that each

variable makes to its canonical variate, and variables with a higher standardized coefficient make a larger contribution to the variate. Variables whose weights have opposite signs exhibit an inverse relationship, while variables whose weights have the same sign exhibit a direct relationship (Hair et al., 1998). The efficacy for instructional and moral leadership variable made the most substantial contribution to the predictor variate (-.812), while the indirect principal behaviors variable made the most substantial contribution to the criterion variate (-1.005). Hair et al. (1998) caution against relying too heavily on using standardized canonical function coefficients to interpret the results of a canonical analysis, however, as they can be affected by multicollinearity and are subject to considerable instability.

Structure coefficients represent the variance that a variable shares with the canonical variate. The most relevant predictor variables were efficacy for instructional and moral leadership (r_s = -.941) and efficacy for management (r_s = -.802). Indirect principal behaviors and direct principal behaviors were both relevant criterion variables (r_s = -.999 and r_s = -.537, respectively).

Table 19
Canonical Solution for First Function

Variable	Coef	r_s	r_s^2 (%)
Gender	.155	.295	8.70
School Level	-.109	.173	2.99
25-49% Economically Disadvantaged	-.060	.200	4.00
50-74% Economically Disadvantaged	-.155	-.090	0.81
75-100% Economically Disadvantaged	-.214	-.066	0.44
Time Spent on Student Discipline	-.128	.137	1.88
Parent Involvement	-.068	-.304	9.24
Efficacy for Instructional and Moral Leadership	-.812	-.941	88.55
Efficacy for Management	-.237	-.802	64.32
R_c^2			60.50
Indirect Principal Behaviors	-1.005	-.999	99.80
Direct Principal Behaviors	.009	-.537	28.84

Coef = standardized canonical function coefficient; r_s = structure coefficient; r_s^2 = squared structure coefficient. Structure coefficients (r_s) greater than |.45| are underlined.

Summary of Canonical Correlation Analysis. A canonical correlation analysis was conducted using the school environment and personal characteristic variables as predictors of the behavior variables. The full model was determined to be statistically significant using Wilks's lambda criterion, $\lambda = .374$, $F(18, 384) = 13.555$, $p < .001$, explaining approximately 63% of the variance shared between the variable sets. Two canonical functions were extracted. After considering the (1) level of statistical significance of the function, (2) magnitude of the canonical relationship, and (3) redundancy measure of shared variance for each canonical function, only the first function was considered noteworthy in the context of this study, explaining 60.5% of the variance. After analyzing the standardized canonical function coefficients, as well as the structure coefficients, it was determined that the most relevant predictor variables were efficacy for instructional and moral leadership ($r_s = -.941$) and efficacy for management ($r_s = -.802$). Direct principal behaviors and indirect principal behaviors were both

relevant criterion variables (r_s = -.999 and r_s = -.537, respectively). These findings support the theoretically expected relationship between principal efficacy and behavior, although they discount the role of personal characteristics and environment.

CHAPTER V

Discussion and Recommendations

Introduction

The current study was based on findings from extant research that principals can affect student achievement. Marzano et al.'s (2005) meta-analysis of 69 principal leadership studies found an average effect size of .25 between principal behavior and student achievement. Marzano et al. also analyzed the quality of each study in their meta-analysis and determined that high quality studies had an even higher average effect size of .31, further supporting the relationship between principal behavior and student achievement. In recent years, as a result of increased pressure to increase student achievement in schools, extant research has begun to focus on ways that principals can directly affect student achievement. Gentilucci and Muto's (2007) study of principal behavior identified several direct behaviors that students perceived as having a positive effect on their achievement. Silva et al. (2011) built upon the findings of Gentilucci and Muto (2007) with an experimental study investigating whether one-on-one discussions between a principal and a student could directly affect the student's subsequent score on a standardized reading test. Silva et al. found that principals can have a significant direct effect on student achievement through achievement-based discussions. Building on these findings, the purpose of the current study was to gain insight into current principals' beliefs and behaviors in an attempt to identify the driving forces behind principal behaviors related to affecting student achievement.

Discussion

The current study found that a substantial portion, 60.5%, of the variance shared between the predictor and criterion variable sets was explained by the relationship between self-efficacy, school and personal characteristics, and principal behaviors related to affecting student achievement. Specifically, efficacy for instructional and moral leadership, and efficacy for management both contributed significantly to the predictor variable set. Principal gender, school level, student socioeconomic status, perceived level of parental involvement, and time spent on student discipline did not make significant contributions to the predictor variable set. Indirect and direct principal behaviors both contributed significantly to the criterion variable set.

Self-Efficacy. The current study found that self-efficacy contributed significantly to the criterion variable set. Principals with stronger beliefs in their capabilities as instructional and moral leaders, as well as in their management, were more likely to behave in ways that could indirectly or directly affect student achievement. Efficacy for instructional and moral leadership shared 88.55% of its variance with the predictor variable set, and efficacy for management shared 64.32% of its variance with the predictor variable set. This finding aligns with extant instructional leadership studies that found a significant relationship between principal self-efficacy and various dimensions of leadership (see Tschannen-Moran & Gareis, 2004; Leithwood & Jantzi, 2008). Tschannen-Moran and Gareis found that principals with a high sense of self-efficacy were, among other things, persistent in pursuing their goals, were flexible and willing to adapt strategies to meet contextual conditions, and did not interpret their inability to solve problems immediately as failure. They also found that principals with a low sense of

efficacy were less likely to identify appropriate strategies to meet contextual conditions, and persisted in their original course of action when confronted with failure. Tschannen-Moran and Gareis did not specifically study the relationship between principal efficacy and behaviors related to indirectly or directly affecting student achievement, but parallels between their study and the current study are clear. Traits such as persistence, flexibility, and adaptability all have a place in principal behavior, particularly as principals continue to face increased pressure to improve student achievement in their schools.

The current study's findings regarding self-efficacy also mirror the central tenet of Bandura's (1986) Social Cognitive Theory. Bandura identified perceived self-efficacy as the most influential mechanism of human agency, influencing: (1) the choices people make, (2) levels of effort, perseverance, and resilience that people demonstrate when completing tasks, and (3) thought patterns and emotional reactions. It is important to note that, according to Bandura, self-efficacy is malleable and can be developed. Bandura argued that self-efficacy develops from four primary sources: (1) enactive mastery experiences, (2) vicarious experiences in the form of modeling, (3) verbal persuasion, and (4) physiological and affective states that may be present when performing a task. The current study's finding that self-efficacy is significantly related to principal behavior, along with Bandura's argument that efficacy is malleable and can be developed, should be very encouraging for those in the field of instructional leadership.

School and Personal Characteristics. The current study found that school and personal characteristics, including principal gender, school level, student socioeconomic status, perceived parental involvement and time spent on student discipline did not contribute significantly to the predictor variable set. These findings are incongruent with

Bandura's Social Cognitive Theory, which emphasized the triadic relationship between environment, personal factors, and behavior. Findings from the current study are also incongruent with extant research. Some researchers have focused on the relationship between school and personal characteristics, and principal efficacy. Findings from these studies indicate that principal gender, school level, student socioeconomic status, perceived parental involvement, and time spent on student discipline all have a significant relationship with principal efficacy (DeMoulin, 1992; Nye, 2008; Santamaria, 2008; Smith et al., 2006). Other scholars have focused on the relationship between school and personal characteristics, and various aspects of instructional leadership. Findings from these studies indicate that student socioeconomic status, principal gender, and perceived parental involvement have a significant relationship with various aspects of instructional leadership (Goldring et al., 2007; Hallinger et al., 1996; Smith et al., 2006).

The discrepant findings between the current study and extant research may be attributed to research design. The current study explored the triadic relationship, as presented by Bandura, between school and personal characteristics, self-efficacy, and principal behaviors related to affecting student achievement. However, extant research has explored a series of dyadic relationships between: (1) self-efficacy and principal leadership, (2) school and personal characteristics, and self-efficacy, and (3) school and personal characteristics, and principal leadership. The more interactive model utilized in the current study found that school and personal characteristics, when simultaneously analyzed with self-efficacy, did not relate significantly to principal behavior. This finding introduces the possibility that previous studies using simple dyadic models may

have found relationships that did not actually exist. The current study's findings regarding school and personal characteristics should be interpreted with caution; this study is not a rejection of extant research, although it may contribute to the existing argument in instructional leadership research that study design matters. The current study's findings should serve as an impetus for future researchers to analyze school and personal characteristics within more interactive models that simultaneously consider self-efficacy.

Principal Behavior. Principal effects research has traditionally focused on the relationship between indirect principal behaviors and student achievement. Researchers have recently begun to take a closer look at direct principal effects on student achievement, challenging the traditional notion that principals can only have an indirect effect on student achievement (see Silva et al., 2010; Gentilucci & Muto, 2007). Until now, however, researchers have not attempted to identify the driving forces behind principal behaviors related to indirectly and directly affecting student achievement. The current study found that indirect and direct principal behaviors related to affecting student achievement both contributed significantly to the dependent variable set. The indirect principal behaviors variable shared 99.80% of its variance with the dependent variable group, and the direct principal behaviors variable shared 28.84% of its variance with the dependent variable group. These findings indicate that self-efficacy may be a strong driver behind principal behavior related to indirectly and directly affecting student achievement. These findings of significance for both indirect and direct principal behaviors also have implications for future research. Social science scholars have argued that it is difficult to disentangle various dimensions of behavior for research. With this in

mind, the focus of future research should be on principal behavior as a single entity that includes indirect and direct behavior, not as two separate entities.

Recommendations for Practice

The current study's findings have several implications for the field of instructional leadership. The following recommendations are offered to pre-service principals, new principals, experienced principals, district administrators, and university professors to improve principal behaviors related to affecting student achievement.

1. Principal preparation programs should foster an awareness of the importance of self-efficacy in future principals. University professors have an opportunity to provide what Bandura (1986) described as verbal persuasion and vicarious experiences in the form of modeling.
2. Mentoring programs for new principals should serve as an extension of principal preparation programs by providing what Bandura described as enactive mastery experiences related to self-efficacy. These experiences should be followed with a process of guided reflection in attempt to make the importance of self-efficacy explicit.
3. Professional development related to the importance of self-efficacy should be provided to practicing principals. Additionally, practicing principals should be encouraged to develop personal goals related developing their own self-efficacy.

4. District administrators should consider a candidate's self-efficacy during the hiring process for new principals. Given its strong relationship with behaviors related to affecting student achievement, district administrators may find it appropriate to use a scale such as Tschannen-Moran and Gareis' (2004) Principal Sense of Efficacy Scale to measure current levels of self-efficacy in principal candidates.

Recommendations for Research

While extant research has traditionally found that principal effects on student achievement are primarily indirect, or mediated by other variables, findings from an emerging body of research indicate that principals can also have a direct, unmediated, effect on student achievement in their schools. Extant research, however, has failed to investigate the complete triadic relationship between self-efficacy, environment, and specific principal behaviors. The current study added to the field by exploring the relationship between principal self-efficacy (efficacy for instructional and moral leadership, efficacy for management), school and personal characteristics (principal gender, school level, student socioeconomic status, perceived parental involvement, time spent on student discipline), and behaviors related to affecting student achievement. The current study yielded encouraging results pertaining to self-efficacy, but additional research is warranted.

1. The current study utilized Canonical Correlation Analysis to identify self-efficacy for instructional and moral leadership, self-efficacy for management,

indirect principal behaviors, and direct principal behaviors as significant contributors in the relationship between principal self-efficacy, school and personal characteristics, and principal behaviors related to affecting student achievement. The data analysis technique used in the current study was not able to describe the relationship between individual school and personal characteristic variables and individual principal behavior variables. Future research should include a post-hoc analysis using more sophisticated data analysis techniques, such as the use of hierarchical or nested structures, in an attempt to more clearly analyze the significance of self-efficacy for instructional and moral leadership, self-efficacy for management, indirect principal behaviors, and direct principal behaviors.

2. The current study used a quantitative data analysis technique to explore the complex relationship between school and personal characteristics and principal behavior. The findings from the current study were limited by the questions included on the survey instrument. Future research should attempt to provide a more clear understanding of this complex relationship through the use of a qualitative technique.
3. The current study utilized a new survey instrument, referred to as the Principal Efficacy, Environment, and Behavior Scale (PEEBS). Future research should replicate the current study in an attempt to provide validity to the survey instrument, as well as the current study's findings.
4. The current study found that self-efficacy for instructional and moral leadership and self-efficacy for management contributed significantly to the

predictor variable set, indicating that principals have some degree of control over the variables that correlate with their behaviors related to affecting student achievement. Future research pertaining to the most effective ways to increase self-efficacy in principals is warranted.

5. The current study asked principals to self-report how often they engage in certain behaviors. This introduced potential bias into the study, as discrepancies may exist between how principals perceive their behavior and how others perceive their behavior. Future research should attempt to overcome this potential bias by collecting data related to principal behaviors from multiple sources, possibly including teachers and students.
6. Finally, the current study used a two-factor model for Tschannen-Moran and Gareis' (2004) Principal Sense of Efficacy Scale, while the original researchers used a three-factor model. Other researchers have found two factors in their factor analyses but force loaded a three-factor model to align with the findings of the instrument's developers (see Santamaria, 2008; Nye, 2008). Further research pertaining to the factor structure of the Principal Sense of Efficacy Scale is warranted.

Conclusion

The current study found that self-efficacy contributed significantly to the relationship between school and personal characteristics, and principal behavior related to affecting student achievement. These findings highlight an important distinction among

the school and personal characteristics, and self-efficacy variables. According to Bandura, the two variables that were found to contribute significantly to the predictor variable set (self-efficacy for instructional and moral leadership, self-efficacy for management) are within a principal's control. However, the five variables that were found to be insignificant in this study (principal gender, school level, student socioeconomic status, perceived parental involvement, and time spent on student discipline) are either completely out of a principal's control or very difficult to control. The current study's findings should encourage principals that they have control over the variables that correlate with their behaviors related to indirectly and directly affecting student achievement. However, findings from this study should be interpreted with caution. This research study was the first of its kind and was designed to be exploratory in nature. The findings do not present any definitive answers, but rather demonstrate that the relationship between self-efficacy and principal behavior (especially direct principal behavior) is worthy of further exploration.

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Appendix A
Principal Efficacy, Environment, and Behavior Scale

Principal Environment, Efficacy, and Behavior Scale

Part 1/3: Environment

Please select the appropriate answer choice for each of the questions about you and your school.

Are you the head principal of a public school in the state of Pennsylvania?

- ○ Yes
- ○ No (If no, there is no need to complete this survey)

Please indicate your gender.

- ○ Male
- ○ Female

Which of the following best describes the level of your school?

- ○ Elementary/Primary
- ○ Middle/Junior High (minimum of two grades 5-8)
- ○ High (minimum of two grades 9-12)
- ○ Other (please specify)

What percentage of students in your school is classified as economically disadvantaged?

- ○ 0-24%
- ○ 25-49%
- ○ 50-74%
- ○ 75-100%

When considering such factors as willingness to communicate with teachers about their child's academic progress and providing a home environment conducive to learning, how would you rate the involvement of parents for the school in which you serve?

Not at all involved		Somewhat involved		Very involved
○	○	○	○	○

On average, how much time do you spend each day on discipline-related issues?

- ○ 0-1 Hours
- ○ 2-3 Hours
- ○ 4-5 Hours
- ○ 6-7 Hours
- ○ 8+ Hours

Principal Environment, Efficacy, and Behavior Scale

Part 2/3: Efficacy

Please indicate your opinion about each of the questions below by marking one of the nine responses in the columns on the right side. The scale responses range from "Not At All" to "A Great Deal," with "Some Degree" representing the mid-point between these low and high extremes. You may choose any of the nine responses, since each represents a degree on the continuum.

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

In your current position, to what extent CAN you...

	Not At All	-	Very Little	-	Some Degree	-	Quite A Bit	-	A Great Deal
Facilitate student learning in your school	○	○	○	○	○	○	○	○	○
Generate enthusiasm for a shared vision for the school	○	○	○	○	○	○	○	○	○
Handle the time demands of the job	○	○	○	○	○	○	○	○	○
Manage change in your school	○	○	○	○	○	○	○	○	○
Promote school spirit among a large majority of the student population	○	○	○	○	○	○	○	○	○
Create a positive learning environment in your school	○	○	○	○	○	○	○	○	○
Raise student achievement on standardized tests	○	○	○	○	○	○	○	○	○
Promote a positive image of your school with the media	○	○	○	○	○	○	○	○	○
Motivate teachers	○	○	○	○	○	○	○	○	○
Promote the prevailing values of the community in your school	○	○	○	○	○	○	○	○	○
Maintain control of your own daily schedule	○	○	○	○	○	○	○	○	○
Shape the operational policies and procedures that are necessary to manage your school	○	○	○	○	○	○	○	○	○
Handle effectively the discipline of students in your school	○	○	○	○	○	○	○	○	○
Promote acceptable behavior among students	○	○	○	○	○	○	○	○	○
Handle the paperwork required of the job	○	○	○	○	○	○	○	○	○
Promote ethical behavior among school personnel	○	○	○	○	○	○	○	○	○

Principal Environment, Efficacy, and Behavior Scale

Cope with the stress of the job	○	○	○	○	○	○	○	○	○
Prioritize among competing demands of the job	○	○	○	○	○	○	○	○	○

Principal Environment, Efficacy, and Behavior Scale

Part 3/3: Behavior

Please indicate your opinion about each of the questions below by marking one of the nine responses in the columns on the right side. The scale responses range from "Not At All" to "A Great Deal," with "Some Degree" representing the mid-point between these low and high extremes. You may choose any of the nine responses, since each represents a degree on the continuum.

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

In your current role as principal, to what extent DO you...

	Not At All	-	Very Little	-	Some Degree	-	Quite A Bit	-	A Great Deal
Continually expose teachers and staff to cutting-edge research and theory on effective schooling	○	○	○	○	○	○	○	○	○
Ensure the school complies with all district and state mandates	○	○	○	○	○	○	○	○	○
Advocate for the school with central office	○	○	○	○	○	○	○	○	○
Systematically and fairly recognize the failures of and celebrate the accomplishments of the school as a whole	○	○	○	○	○	○	○	○	○
Accurately predict what could go wrong from day to day	○	○	○	○	○	○	○	○	○
Demonstrate behaviors that are consistent with beliefs	○	○	○	○	○	○	○	○	○
Frequently review and discuss student work progress with students	○	○	○	○	○	○	○	○	○
Consciously challenge the status quo	○	○	○	○	○	○	○	○	○
Cultivate an approachable persona by consistently engaging with students	○	○	○	○	○	○	○	○	○
Provide opportunities for teachers and staff to be involved in developing school policies	○	○	○	○	○	○	○	○	○

Principal Environment, Efficacy, and Behavior Scale

Part 3/3: Behavior (continued)

Continued: In your current role as principal, to what extent DO you...

	Not At All	-	Very Little	-	Some Degree	-	Quite A Bit	-	A Great Deal
Provide opportunities for teacher and staff input on all important decisions	○	○	○	○	○	○	○	○	○
Promote cohesion among teachers and staff	○	○	○	○	○	○	○	○	○
Provide and reinforce clear structures, rules, and procedures for teachers and staff	○	○	○	○	○	○	○	○	○
Exhibit teacher behaviors during classroom visits (walking around, giving gentle correction, praise, and encouragement)	○	○	○	○	○	○	○	○	○
Keep informed about current research and theory on effective schooling	○	○	○	○	○	○	○	○	○
Provide and reinforce clear structures, rules, and procedures for students	○	○	○	○	○	○	○	○	○
Consistently attempt to operate at the edge versus the center of the school's competence	○	○	○	○	○	○	○	○	○
Advocate for the school with parents	○	○	○	○	○	○	○	○	○
Remain aware of the impact of the school's practices on student achievement	○	○	○	○	○	○	○	○	○
Continually monitor the effectiveness of the school's assessment practices	○	○	○	○	○	○	○	○	○

Principal Environment, Efficacy, and Behavior Scale

Part 3/3: Behavior (continued)

Continued: In your current role as principal, to what extent DO you...

	Not At All	-	Very Little	-	Some Degree	-	Quite A Bit	-	A Great Deal
Systematically consider new and better ways of doing things	○	○	○	○	○	○	○	○	○
Directly involve yourself in helping teachers design curricular activities and address assessment and instructional issues	○	○	○	○	○	○	○	○	○
Promote cooperation among teachers and staff	○	○	○	○	○	○	○	○	○
Share beliefs about schooling, teaching, and learning with the teachers and staff	○	○	○	○	○	○	○	○	○
Continually monitor the effectiveness of the school's curricular practices	○	○	○	○	○	○	○	○	○
Communicate high expectations directly to students in achievement-based discussions	○	○	○	○	○	○	○	○	○
Interact with students during classroom visits	○	○	○	○	○	○	○	○	○
Ensure that teachers and staff have the necessary materials and equipment	○	○	○	○	○	○	○	○	○
Communicate the school's mission directly to students	○	○	○	○	○	○	○	○	○
Make yourself aware of informal groups and relationships among teachers and staff	○	○	○	○	○	○	○	○	○

Principal Environment, Efficacy, and Behavior Scale

Part 3/3: Behavior (continued)

Continued: In your current role as principal, to what extent DO you...

	Not At All	-	Very Little	-	Some Degree	-	Quite A Bit	-	A Great Deal
Develop an understanding of purpose among teachers and staff	○	○	○	○	○	○	○	○	○
Lead change initiatives with uncertain outcomes	○	○	○	○	○	○	○	○	○
Continually monitor the effectiveness of the school's instructional practices	○	○	○	○	○	○	○	○	○
Know what students are studying and help them with assignments	○	○	○	○	○	○	○	○	○
Communicate to students that you are interested in their personal academic challenges and successes	○	○	○	○	○	○	○	○	○
Involve students in monitoring their own academic progress	○	○	○	○	○	○	○	○	○
Promote a sense of well being among teachers and staff	○	○	○	○	○	○	○	○	○
Systematically and fairly recognize the accomplishments of teachers and staff	○	○	○	○	○	○	○	○	○
Advocate for the school with the community at large	○	○	○	○	○	○	○	○	○
Possess well-defined beliefs about schools, teaching, and learning	○	○	○	○	○	○	○	○	○

Principal Environment, Efficacy, and Behavior Scale

Part 3/3: Behavior (continued)

Continued: In your current role as principal, to what extent DO you...

	Not At All	-	Very Little	-	Some Degree	-	Quite A Bit	-	A Great Deal
Have informal conversations with students about academic achievement	○	○	○	○	○	○	○	○	○
Systematically and fairly recognize and celebrate the accomplishments of students on an individual basis	○	○	○	○	○	○	○	○	○
Help students with assignments during classroom visits	○	○	○	○	○	○	○	○	○
Establish routines for the effective running of the school that teachers and staff understand and follow	○	○	○	○	○	○	○	○	○
Make yourself aware of the issues in the school that have not surfaced but could create discord	○	○	○	○	○	○	○	○	○
Foster systematic discussion regarding current research and theory on effective schooling	○	○	○	○	○	○	○	○	○
Use leadership teams in decision-making	○	○	○	○	○	○	○	○	○
Ensure that teachers and staff have the necessary professional development opportunities that directly enhance their teaching	○	○	○	○	○	○	○	○	○

Appendix B
Expert Review Protocol

Dear _____:

It is widely accepted that principals are facing increased pressure to improve student achievement in their schools. Principals who look to research for the most effective ways to address this pressure are finding conflicting data supporting both indirect and direct effects of principals on student achievement. Additionally, existing research fails to identify the "why;" why do some principals tend to behave in more indirect ways while other principals tend to behave in more direct ways? My doctoral study, through Lehigh University, will explore the relationship between principal self-efficacy, school environment/personal characteristics, and principal behavior.

I am requesting your expert assistance with developing the content validity for the behavior portion of a new survey instrument entitled the Principal Efficacy, Environment, and Behavior Scale. The behavior portion of the instrument is currently made up of 48 behaviors that have been linked to increased student achievement in extant research. Your feedback will be collected through a modified Delphi technique, which will allow each panelist to provide feedback without being influenced by other panelists. Appropriate changes will be made to the survey instrument based on recommendations from the panelists.

In the first round of the modified Delphi process, you are asked to label each item included on the behavior portion of the draft survey instrument as indirect, direct, or both. You are also asked in the first round to provide any additional direct principal behaviors that you believe are related to student achievement. Please use the enclosed form to complete the first round. You will be informed about any additional rounds of feedback collection after the first round is complete.

If you have any questions about your participation on the expert review panel, please contact me by phone at (215) 920-5491 or by email at mts209@lehigh.edu. You may also contact my advisor, Dr. George White, at Lehigh University, (610) 758-3262. Any problems or concerns that may result from your participation in this expert review panel may be reported to Ruth Tallman, Office of Research, Lehigh University, (610) 758-3024.

Sincerely,

Mike Szymendera

Appendix C
Expert Review Feedback Form – Round 1

Part 1. Please label each principal behavior as having an indirect effect on student achievement, a direct effect on student achievement, or a combination of both.	
1	Systematically and fairly recognize the accomplishments of teachers and staff ☐ Indirect ☐ Direct ☐ Both
2	Systematically and fairly recognize and celebrate the accomplishments of students on an individual basis ☐ Indirect ☐ Direct ☐ Both
3	Systematically and fairly recognize the failures of and celebrate the accomplishments of the school as a whole ☐ Indirect ☐ Direct ☐ Both
4	Consciously challenge the status quo ☐ Indirect ☐ Direct ☐ Both
5	Lead change initiatives with uncertain outcomes ☐ Indirect ☐ Direct ☐ Both
6	Systematically consider new and better ways of doing things ☐ Indirect ☐ Direct ☐ Both
7	Consistently attempt to operate at the edge versus the center of the school's competence ☐ Indirect ☐ Direct ☐ Both
8	Promote a sense of well being among teachers and staff ☐ Indirect ☐ Direct ☐ Both
9	Promote cohesion among teachers and staff ☐ Indirect ☐ Direct ☐ Both
10	Develop an understanding of purpose among teachers and staff ☐ Indirect ☐ Direct ☐ Both
11	Develop a shared vision of what the school could be like ☐ Indirect ☐ Direct ☐ Both
12	Promote cooperation among teachers and staff ☐ Indirect ☐ Direct ☐ Both
13	Possess well-defined beliefs about schools, teaching, and learning ☐ Indirect ☐ Direct ☐ Both

14	Share beliefs about school, teaching, and learning with the teachers and staff ☐ Indirect ☐ Direct ☐ Both	
15	Demonstrate behaviors that are consistent with beliefs ☐ Indirect ☐ Direct ☐ Both	
16	Provide opportunities for teacher and staff input on all important decisions ☐ Indirect ☐ Direct ☐ Both	
17	Provide opportunities for teachers and staff to be involved in developing school policies ☐ Indirect ☐ Direct ☐ Both	
18	Use leadership teams in decision-making ☐ Indirect ☐ Direct ☐ Both	
19	Keep informed about current research and theory on effective schooling ☐ Indirect ☐ Direct ☐ Both	
20	Continually expose teachers and staff to cutting-edge research and theory on effective schooling ☐ Indirect ☐ Direct ☐ Both	
21	Foster systematic discussion regarding current research and theory on effective schooling ☐ Indirect ☐ Direct ☐ Both	
22	Directly involve yourself in helping teachers design curricular activities and address assessment and instructional issues ☐ Indirect ☐ Direct ☐ Both	
23	Continually monitor the effectiveness of the school's curricular practices ☐ Indirect ☐ Direct ☐ Both	
24	Continually monitor the effectiveness of the school's instructional practices ☐ Indirect ☐ Direct ☐ Both	
25	Continually monitor the effectiveness of the school's assessment practices ☐ Indirect ☐ Direct ☐ Both	
26	Remain aware of the impact of the school's practices on student achievement ☐ Indirect ☐ Direct ☐ Both	
27	Provide and reinforce clear structures, rules, and procedures for teachers and staff ☐ Indirect ☐ Direct ☐ Both	

28	Provide and reinforce clear structures, rules, and procedures for students ☐ Indirect ☐ Direct ☐ Both
29	Establish routines for the effective running of the school that teachers and staff understand and follow ☐ Indirect ☐ Direct ☐ Both
30	Ensure the school complies with all district and state mandates ☐ Indirect ☐ Direct ☐ Both
31	Advocate for the school with the community at large ☐ Indirect ☐ Direct ☐ Both
32	Advocate for the school with parents ☐ Indirect ☐ Direct ☐ Both
33	Advocate for the school with central office ☐ Indirect ☐ Direct ☐ Both
34	Ensure that teachers and staff have the necessary materials and equipment ☐ Indirect ☐ Direct ☐ Both
35	Ensure that teachers and staff have the necessary professional development opportunities that directly enhance their teaching ☐ Indirect ☐ Direct ☐ Both
36	Make yourself aware of informal groups and relationships among teachers and staff ☐ Indirect ☐ Direct ☐ Both
37	Make yourself aware of the issues in the school that have not surfaced but could create discord ☐ Indirect ☐ Direct ☐ Both
38	Accurately predict what could go wrong from day to day ☐ Indirect ☐ Direct ☐ Both
39	Communicate the school's mission directly to students ☐ Indirect ☐ Direct ☐ Both
40	Involve students in monitoring their own academic progress ☐ Indirect ☐ Direct ☐ Both
41	Communicate high expectations directly to students in achievement-based discussions ☐ Indirect ☐ Direct ☐ Both

42	Cultivate an approachable persona by consistently engaging with students ☐ Indirect ☐ Direct ☐ Both	
43	Communicate to students that you are interested in their personal academic challenges and successes ☐ Indirect ☐ Direct ☐ Both	
44	Have informal conversations with students about academic achievement ☐ Indirect ☐ Direct ☐ Both	
45	Interact with students during classroom visits ☐ Indirect ☐ Direct ☐ Both	
46	Exhibit teacher behaviors during classroom visits (walking around, giving gentle correction, praise, and encouragement) ☐ Indirect ☐ Direct ☐ Both	
47	Help students with assignments during classroom visits ☐ Indirect ☐ Direct ☐ Both	
48	Know what students are studying and help them with assignments ☐ Indirect ☐ Direct ☐ Both	

Part 2. Please list any principal behaviors that you believe have a direct effect on student achievement that are not included on the existing list.

Appendix D
Expert Review Feedback Form – Round 2

Expert Review Feedback Form – ROUND 2 REVIEWER NAME:

For the purpose of this study, these definitions are used for the following terms:

Behaviors Related to Indirectly Affecting Student Achievement - a measurable cause for a change in performance, mediated by other variables

Behaviors Related to Directly Affecting Student Achievement - a measurable cause for a change in performance, not mediated by other variables

Part 1. During the first round, a member of the expert review panel recommended the following principal behavior be added to the survey instrument:

Frequently review and discuss student work progress with students

1. Do you believe this principal behavior has a direct effect on student achievement?

YES NO

Part 2. The following principal behaviors failed to receive agreement from the expert review panel as being indirect, direct, or both. Please review the definitions of indirect and direct behaviors and re-indicate whether you believe each of the following behaviors is indirect, direct, or both. Additionally, please provide a brief rationale for your selection.

1. *Provide and reinforce clear structures, rules, and procedures for students*

INDIRECT DIRECT BOTH

Rationale:

2. *Directly involve yourself in helping teachers design curricular activities and address assessment and instructional issues*

INDIRECT DIRECT BOTH

Rationale:

3. *Ensure that teachers and staff have the necessary materials and equipment*

INDIRECT DIRECT BOTH

Rationale:

4. *Continually monitor the effectiveness of the school's instructional practices*

INDIRECT DIRECT BOTH

Rationale:

Appendix E
Pilot Study Protocol

Thank you for considering participation in a pilot study to help me refine a survey instrument to be used as part of my Educational Leadership dissertation requirements at Lehigh University. If you agree, your role is to complete the survey instrument and provide feedback about: 1) the length of time it takes to complete the survey; and 2) the clarity of instructions and of the questions themselves.

My study will explore the relationship between principal self-efficacy, school environment/personal characteristics, and principal behavior. The actual study will be conducted among public school principals in the state of Pennsylvania.

Minimal risk is associated with this study. Your confidentiality and those of others who complete the survey will be protected. The data from your involvement will not be published and will only be used to help refine the procedures for the larger study. Furthermore, data from the pilot study will not be used in published documents associated with the dissertation.

If you have any questions about this pilot study, please contact me by phone at (215) 920-5491 or by email at mts209@lehigh.edu. You may also contact my advisor, Dr. George White, (610) 758-3262. Any problems or concerns that may result from your participation in this pilot study may be reported to Ruth Tallman, Office of Research, Lehigh University, (610) 758-3024.

Please use the enclosed feedback form to record your comments about the survey.

Appendix F
Pilot Study Feedback Form

Pilot Study – The relationship between principal self-efficacy, school environment/personal characteristics, and principal behavior.

Please keep this form in front of you as you complete the DRAFT Principal Efficacy, Environment, and Behavior Scale

1. a. Note time you begin the survey _____

   b. Note time you finish the survey _____

   c. Time required to complete survey (rounded to the nearest minute) _____

2. Please comment on clarity of (offer suggestions for improvement where appropriate):

   a. Instructions:

   b. Survey Items:

3. Any other feedback?

Appendix G
First Email to Sample Principals

Dear Principal:

As part of my doctoral work at Lehigh University, I am asking that you please complete a brief online survey. Your participation in the survey is completely voluntary and anonymous. Based on a pilot study, it should take approximately 11 minutes to complete the survey. The survey is approved by the Lehigh University Office of Research and Sponsored Programs.

The survey is available via the following link:
https://www.surveymonkey.com/s/LL9LQ6B

It is widely accepted that principals are facing increased pressure to improve student achievement in their schools. Principals who look to research for the most effective ways to address this pressure are finding conflicting data supporting both indirect and direct effects of principals on student achievement. Additionally, existing research fails to identify the "why." Why do some principals tend to behave in more indirect ways while other principals tend to behave in more direct ways? My research will explore the relationship between principal self-efficacy, school environment/personal characteristics, and principal behavior.

The first portion of the survey asks you to answer a series of demographic questions about you and your school. The second portion of the survey asks you to rate the extent to which you think you can do specific things based on your current ability, resources, and opportunities. The third portion of the survey asks you to rate how often you behave in specific ways.

Your responses will be completely confidential and anonymous. Only group data will be reported as the surveys are not coded to identify respondents in any way. If you have any questions or concerns pertaining to this study, please feel free to contact my advisor, Dr. George White, 610-758-3262, or Ruth Tallman from the Lehigh University Office of Research, 610-758-3024.

Thank you for considering participation in this study. The deadline for completed surveys is Friday, December 7th.

Sincerely,

Mike Szymendera

Appendix H
Second Email to Sample Principals

If you have already completed my survey, thank you. If not, please consider completing my brief on-line survey (https://www.surveymonkey.com/s/LL9LQ6B). My original e-mail can be found below.

Dear Principal:

As part of my doctoral work at Lehigh University, I am asking that you please complete a brief online survey. Your participation in the survey is completely voluntary and anonymous. Based on a pilot study, it should take approximately 11 minutes to complete the survey. The survey is approved by the Lehigh University Office of Research and Sponsored Programs.

The survey is available via the following link:
https://www.surveymonkey.com/s/LL9LQ6B

It is widely accepted that principals are facing increased pressure to improve student achievement in their schools. Principals who look to research for the most effective ways to address this pressure are finding conflicting data supporting both indirect and direct effects of principals on student achievement. Additionally, existing research fails to identify the "why." Why do some principals tend to behave in more indirect ways while other principals tend to behave in more direct ways? My research will explore the relationship between principal self-efficacy, school environment/personal characteristics, and principal behavior.

The first portion of the survey asks you to answer a series of demographic questions about you and your school. The second portion of the survey asks you to rate the extent to which you think you can do specific things based on your current ability, resources, and opportunities. The third portion of the survey asks you to rate how often you behave in specific ways.

Your responses will be completely confidential and anonymous. Only group data will be reported as the surveys are not coded to identify respondents in any way. If you have any questions or concerns pertaining to this study, please feel free to contact my advisor, Dr. George White, 610-758-3262, or Ruth Tallman from the Lehigh University Office of Research, 610-758-3024.

Thank you for considering participation in this study. The deadline for completed surveys is Friday, December 7th.

Sincerely,

Mike Szymendera

Appendix I
Third Email to Sample Principals

If you have already completed my survey, thank you. If not, please consider completing my brief on-line survey (https://www.surveymonkey.com/s/LL9LQ6B). The survey will close this Friday, December 7th. My original e-mail can be found below.

Dear Principal:

As part of my doctoral work at Lehigh University, I am asking that you please complete a brief online survey. Your participation in the survey is completely voluntary and anonymous. Based on a pilot study, it should take approximately 11 minutes to complete the survey. The survey is approved by the Lehigh University Office of Research and Sponsored Programs.

The survey is available via the following link:
https://www.surveymonkey.com/s/LL9LQ6B

It is widely accepted that principals are facing increased pressure to improve student achievement in their schools. Principals who look to research for the most effective ways to address this pressure are finding conflicting data supporting both indirect and direct effects of principals on student achievement. Additionally, existing research fails to identify the "why." Why do some principals tend to behave in more indirect ways while other principals tend to behave in more direct ways? My research will explore the relationship between principal self-efficacy, school environment/personal characteristics, and principal behavior.

The first portion of the survey asks you to answer a series of demographic questions about you and your school. The second portion of the survey asks you to rate the extent to which you think you can do specific things based on your current ability, resources, and opportunities. The third portion of the survey asks you to rate how often you behave in specific ways.

Your responses will be completely confidential and anonymous. Only group data will be reported as the surveys are not coded to identify respondents in any way. If you have any questions or concerns pertaining to this study, please feel free to contact my advisor, Dr. George White, 610-758-3262, or Ruth Tallman from the Lehigh University Office of Research, 610-758-3024.

Thank you for considering participation in this study. The deadline for completed surveys is Friday, December 7th.

Sincerely,

Mike Szymendera