EVIDENCE-BASED DECISION MAKING: INFLUENCES ON CENTRAL-OFFICE ADMINISTRATORS' DECISION-MAKING PRACTICES

A Dissertation

by

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ABSTRACT

The No Child Left Behind Act of 2002 and the Individuals with Disabilities Improvement Education Act of 2004 mandated that state and local education agencies assured that programs and interventions purchased with federal funds were proven effective through rigorous, scientifically-based research. This mandate required central office administrators who managed federal budgets to make evidence-based decisions when purchasing interventions and programs with federal funds. In this study, central office administrators across the state of Texas were surveyed to obtain information about their evidence-based decision-making practices and the factors that influenced them when making decisions about interventions for their districts.

The purpose of this quantitative non-experimental study was to identify the evidence-based decision-making practices of central office administrators (n = 268) and the factors that influence them. Based on the findings in the literature, a survey was developed to collect data to examine correlations between central office administrators' evidence use in decision-making and (a) administrator knowledge of evidence-based practices, confidence in understanding statistical methodology and analyses, and beliefs about research; (b) individual administrator characteristics measured by education, experience, and employment; (c) school district characteristics such as size, type, location, and presence of policies; and (d) the administrator level at which evidence-based decisions were made. Data were collected using survey methodology. Factor analysis, regression analysis, and ANOVAs were employed to analyze the data.

The present study provides evidence that administrators' knowledge of evidence-based practices and their self confidence in their own ability to understand the statistical methodologies and analyses that are typically found in research studies, impact administrators' evidence-based decision-making practices; however, results from this sample did not support the importance of administrators' beliefs about research in general. Results indicated that individual administrator level of education, administrative experience, and current employment did not predict their evidence-based decision-making practices. However, the data did indicate that the type of district (rural, suburban, urban), size of the district, and the presence of policies concerning evidence-based practices did impact administrators' evidence-based decision-making practices. Finally, to provide some insight on the impact of organizational structure on evidence-based decision-making, this study investigated the level within the central office where evidence-based decisions were made. Findings indicated that in urban districts, the majority of decisions were made by the program director or the assistant superintendent, whereas suburban districts identified program directors/budget managers as the primary decision-maker. Small rural districts appeared to make decisions at the higher superintendent level; however, this could be due to the fact that in some small rural districts the superintendent is also the program director/budget manager, yet only identified themselves as superintendent in the study.

DEDICATION

To my husband Don,

for your encouragement and patience throughout this endeavor.

I could not have finished this degree without your love and encouragement. Our love and support for each other has been able to withstand yet another endurance test during our 40+ years together.

To my parents,

my mother who instilled in me at an early age a love of learning and a desire to succeed and my father, although not here to see my success, who instilled in me a strong work ethic and perseverance to get the job done and do it well.

To my children,

Randi and Rusty, who motivate me to be better at everything I do, I love you more than words can express and I hope my achievement will make you proud. And thank you Wes and Liz for all that you do for my children, we are blessed that you are a part of our family.

To my grandchildren,

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I hope my achievement will encourage you to set lofty goals and

then to work diligently to meet them, and always remember

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CHAPTER I

INTRODUCTION

Evidence-based practice is a process for "using research information and documented, supported facts (evidence) to support or determine a critical decision or judgment" (Sullivan, 2009, p. 1). For several decades, there has been a widespread movement for professionals in many fields to utilize evidence-based practice as a means for making decisions. In the late 1990s, the medical field initiated such a movement to encourage physicians to use evidence-based practice to ensure the development of effective, efficient, and optimal treatment plans for their patients (Sullivan, 2009). Other professionals, such as nurses, physical therapists, and social workers, have followed suit and now utilize evidence-based practice methodology to guide their practice and educate them concerning their decision making (Funk, Champagne, Weise, & Tornquist, 1991; Rubin & Parrish, 2011; Schreiber, Stern, Marchetti, & Provident, 2009).

At the root of evidence-based practice is the identification and use of the best available evidence when making decisions about professional practice, particularly when faced with complex issues (Satterfield et al., 2009). Professionals who have used evidence-based practice in their decision-making process have experienced positive results and have noted that evidence-based practice is a promising method for narrowing the research to practice gap (Bryar et al., 2003; Funk et al., 1991; Ploeg, Davies, Edwards, Gifford, & Miller, 2007). However, in the field of education, using evidence-

based practice as a process for making educational decisions has been slow to catch on (Slavin, 2002).

Research Questions

The research questions for this study were developed based on the current literature concerning the use of evidence-based practices in decision-making by central office administrators (Coburn, Honig, & Stein, 2009; Coburn & Talbert, 2006; Coburn, Toure, & Yamashita, 2009; Farley-Ripple, 2008). Other professional fields have experienced barriers to the implementation of evidence-based practices. Because the field of nursing has published several studies on this topic and education has limited research, one focus of the present study was to examine and compare the findings from this study in education with those from the field of nursing.

Based on the findings in the literature, the present study examined (a) correlations between evidence use and administrator confidence in understanding statistical methodology and analyses, and (b) individual administrator and school district characteristics that have contributed to administrator use of evidence-based practices for making instructional decisions. The following research questions were addressed:

Research question I: To what extend does administrators' (a) *Knowledge*, (b) *Beliefs* and (c) *Self-Confidence* concerning statistical methodology and analysis predict administrators' perceptions of their evidence-based decision-making practices?

Research question II: To what extent can central-office administrator's individual characteristics of education, experience, and employment

predict their perceptions of their evidence-based decision-making practices?

Research question III: To what extent can central-office administrators' individual school districts' characteristics such as type (rural, suburban, urban), size, geographic region, and policies predict their perceptions of their evidence-based decision-making practices?

Research question IV: At what administrator level are evidence-based practice decisions made?

Background

The push for evidence-based practice in education began with federal requirements for using scientifically-based research to identify effective programs and practices for improving student achievement. These requirements began with the No Child Left Behind Act (NCLB, 2002) and were soon followed by the Individuals with Disabilities Education Improvement Act (IDEIA, 2004). These programs mandate that federally funded state and local education agencies ensure that programs and interventions purchased with these funds are proven effective through rigorous, scientifically based research (IDEIA, 2004; NCLB, 2002).

Due to the NCLB and IDEIA mandates, producers of educational products quickly publicized their wares as *research-based* and, consequently, the term became a standard sales tool for marketers of educational products (Pellegrino & Goldman, 2002; Popham, 2005; Stone, 2003). Administrators were inundated with volumes of information from many educational product companies that were claiming their products

were proven effective through scientifically based research and, therefore, deemed to be NCLB compliant (Popham, 2005). On the surface, the research-based claims seemed to make decision making easy for school administrators; however, the research-based and NCLB compliant claims were not always plausible. A substantial amount of the research-based claims were founded on valid studies; yet, there were concerns of conflicts of interest and doubts about the merit of some research, particularly when producers of educational products conducted their own research on their own products (Stone, 2003).

Problem Statement

The No Child Left Behind Act (NCLB) of 2002 changed the face of public education with reforms that were intended to improve student achievement (Feuer, Towne, & Shavelson, 2002; Towne, Wise, & Winters, 2005). Student performance standards increased each year with the NCLB accountability requirements, and schools were required to meet these performance standards, also known as adequate yearly progress (AYP). Districts not meeting AYP standards were faced with state education agency monitoring and possible monetary sanctions (TEA, 2012). Schools and school districts struggling to meet the increasing student achievement standards often utilized federal funding though NCLB and IDEIA to support programs and interventions used to address student achievement shortfalls. However, these federal funds included restrictions on spending. Schools receiving federal funds for school improvement were required to ensure that interventions and products were proven effective through scientifically based research (IDEIA, 2004; NCLB, 2002).

The research-based funding ties that permeate both NCLB and IDEIA obligate local education agencies (LEA) to ensure that all federal funding purchases meet research-based effectiveness requirements (IDEIA, 2004; NCLB, 2002). The daunting task of confirming that programs and interventions have the research to support claims of effectiveness usually falls on the central office administrator who manages the federal budget. Yet, concerns of excessive use of the term *research-based,* as well as fears of questionable research, require administrators to examine the evidence. More specifically, to meet the evidence-based requirements needed to receive federal funding and to identify programs with proven effectiveness that support their instructional and programmatic decisions, administrators must read, understand, and analyze research information (Slavin, 2002; Sullivan, 2009).

For the purposes of this study, distinguishing between scientifically-based research, data-based decisions, and evidence-based practice is important; otherwise, we risk that readers will get these terms confused. *Data-based decision making* is a procedure whereby schools regularly collect data related to student achievement, demographics, and school programs and use these data to make decisions about instruction. Collecting and analyzing student achievement data allows teachers and administrators to identify areas of need and develop insights about student achievement concerns (Messelt, 2004). Yet, collecting and disaggregating student achievement data to understand student achievement deficits is only the beginning in solving academic achievement concerns. Once data are collected and skill deficits are identified, teachers and administrators must make decisions about what interventions should be

implemented to address the deficits. *Scientifically-based research* refers to rigorous research methods and analysis that are systematic and objective, and provides evidence of an intervention's effectiveness and likelihood of improving teaching and learning (Slavin, 2008). In addition, *evidence-based practice* in an educational context refers to a decision-making process whereby data and research results are used to determine an intervention has evidence of effectiveness to improve student learning (Lachat & Smith, 2005). The focus of this present study was to examine evidence-based practices and the factors that determine how, or if, administrators use research evidence in their decision-making practices.

Rationale for the Study

In their efforts to improve teaching and learning, schools have often utilized both NCLB and IDEIA federal funding to pay for (a) instructional programs, (b) professional development, (c) curriculum materials, and (d) a multitude of varied intervention products (Coburn, Honig, & Stein, 2009). Districts made purchases and were responsible for ensuring that each purchase met the research-based requirements outlined in NCLB and IDEIA. To meet research-based requirements, central office administrators who managed federal funds must have been critical consumers of research, utilizing research evidence to identify interventions that would provide the desired outcome of increased student achievement (Coburn, Honig, & Stein, 2009; Coburn & Talbert, 2006; Coburn, Toure, & Yamashita, 2009). Both the research-based requirement and the ties to federal funding make the ability to understand research a critical factor in administrative decision making (Coburn, Honig, & Stein, 2009).

Currently, there are few empirical studies that have examined central office administrators' use or ability to use research as evidence in their decision-making process (Coburn, Honig, & Stein., 2009; Coburn & Talbert, 2006; Coburn, Toure, & Yamashita, 2009).

Central office administrators have a unique opportunity to be the connection between research and practice in education, as they hold the key to implementing new programs, interventions, and innovative ideas throughout their districts (West & Rhoton, 1994). In the past, the primary duty of central office administrators was management. However, today they must work closely with schools to foster high-quality instruction (Honig, 2008; Shulman, 1983; Vander Ark, 2002). More importantly, the opportunity exists for administrators to use research to make educational and instructional decisions that will improve student achievement in their districts. Yet, marketer claims of *research-based* educational products, as well as concerns associated with the quality and reporting practices of some educational researchers, leave administrators with the task of ensuring that programs and interventions intended to improve student achievement meet evidence-based effectiveness requirements. However, concerns about administrators' abilities to identify quality research and interpret findings in a useful way have created a conundrum soliciting further investigation (Powers, 2005; Stone & Clements, 1998).

Empirical studies examining the evidence-based practices of teachers have been found in journals and internet searches, but studies concerning central office administrators' use of evidence-based practices to inform their decision making are limited. Of the few studies that have been conducted, results indicated that

administrators' use of evidence-based practices have been either minimal or symbolic (Coburn, Honig, Stein, 2009; Coburn & Talbert, 2006; Coburn, Toure, & Yamashita, 2009; Farley-Ripple, 2008). Therefore, this investigation to identify factors that predict central office administrators' use of evidence is important for several reasons. First, this study adds to the current literature by investigating the factors that influence how research evidence is used (or not) by central office administrators on a much broader scale. Second, this study provides implications for increasing the use of research evidence and evidence-based decision-making practices. Finally, these findings provide direction for future studies and training that may lead to improving evidence-based decision-making by central office administrators.

Sample and procedure. The present study was conducted to examine Texas central office administrators' use of research-based evidence and the factors that influence them in their decision-making practices. Superintendents, special education directors, and directors of federal and state programs were chosen to participate because they typically are the budget managers for their districts' federal funds. Superintendents and directors were surveyed to gain information about their practices and procedures for making decisions and how they use research in their decision-making process.

A survey was administered online to obtain information about the use of research evidence and factors relating to evidence use. Based on the literature, a survey was developed to gather information concerning these practices (Funk et al., 1991). The survey was distributed through electronic mail to the public school districts in all 20 Educational Service Center (ESC) Regions in the state of Texas. Information gathered

from the 48-question survey was analyzed using multiple regression and ANOVA methods.

Framework and context. Over a decade has passed since the enactment of the No Child Left Behind Act that brought about requirements of using scientifically-based research to determine the effectiveness of programs and interventions purchased with federal dollars. However, guidelines determining the value of research evidence continue to be sketchy at best. Because there has been no single resource that can answer all questions about all programs, it is imperative that school administrators have a good understanding of research methodologies and analyses. This is especially true for central office administrators who are responsible for the management of federal budgets, such as IDEIA and NCLB, which specifically require that interventions and programs funded with federal monies have rigorous scientifically-based research confirming their effectiveness (IDEIA, 2004; NCLB, 2001). Although there have been studies about the use of data to drive instruction on campuses, there is little empirical research on the decision-making practices of central office administrators who are responsible for managing federal budgets (Coburn & Talbert, 2006).

Operational definitions. For the purposes of this study the following definitions applied:

- Intervention: a set of replicable procedures, materials, professional development, or service configurations that educators could choose to implement to improve student outcomes.

- Administrator or School Administrator: A central-office superintendent, director or coordinator who manages NCLB and/or IDEA federal budgets.
- Evidence-based Practices or Evidence-based Decision-making Practices: The process of using research evidence to support or determine a critical decision.
- Perceptions of Practice: Perceptions of evidence-based decision-making practices.

Variables. Sullivan (2009) described evidence-based practice as a process for "using research information and documented, supported facts (evidence) to support or determine a critical decision or judgment" (p. 1). Through survey methodology, this study sought to determine the self-confidence of central office level administrators concerning basic research methodology and statistical analysis and how self-confidence is related to their use of evidence-based practice in their educational decision making. In addition, this study sought to identify the impact of both individual administrator characteristics and school district characteristics on the administrators' use of evidence-based practice. More specifically, this study sought to examine the factors that may predict central office administrators' use of research evidence in decision making and the factors that influence their evidence use.

***Independent variables*.** The independent variables used in this present study were the individual characteristics of administrators, the characteristics of the school district, and the administrators' self-confidence concerning research methodology and statistical analysis. Characteristics of the administrator were measured by (a) administrative experience, (b) experience in current job position, and (c) highest attained

degree. District characteristics were measured by (a) district type, (b) district size, (c) geographical location, and (d) the presence of evidence-based policies. To determine the administrators' self-confidence in their knowledge of research methodology and statistical analysis, administrators were asked to identify their level of self-confidence when provided with statements concerning research methodology, experimental design, statistical analysis, and interpretation of research results.

Dependent variable. The dependent variable in this study was the perceptions of evidence-based practices that administrators engaged in when making an educational decision. Administrator perceptions of evidence-based practices were measured by providing administrators with statements about evidence-based practices and asking them to respond based on their level of agreement.

Organization of the Study

This research study is organized into five chapters. Chapter I presents an overview of evidence-based practice, and introduces the problem statement and research questions, as well as a description of the variables in the study. Chapter II contains a review of literature and relevant research associated with evidence-based practices, as well as the controversies surrounding educational research. Chapter III provides a description of the research methodology for the present study and an outline of the data collection and analyses. Chapter IV presents the results of the data analyses and findings that emerged from the study. Finally, Chapter V contains a summary of the study findings, conclusions drawn from the findings, and a discussion of the results that led to implications for practice and recommendations for future research.

CHAPTER II

REVIEW OF LITERATURE

Schools and school administrators are held accountable for student achievement more now than ever by both the state and federal government. Although the emphasis on accountability is not new, accountability systems continue to become more complex. Along with more complex accountability systems comes a continuous increase in expectations for student achievement. Meeting the increased student expectations requires ongoing professional development regarding effective practices, as well as materials and interventions to improve teaching and learning (Slavin, 2002). Federal funds available to schools provide professional development and the ability to purchase materials and interventions. However, along with the provision of these funds comes strict requirements of research-based evidence. Although the ultimate responsibility for budgets lies with the superintendent of the district, program administrators at the district level are usually assigned to oversee the expenditures of federal funds and have been responsible for ensuring that the programs, products, and practices for which federal funds are spent meet the evidence of effectiveness required in the law (TEA, 2012).

The challenge of identifying suitable interventions for their schools required administrators to critically review the evidence to determine if requirements for proven effectiveness through scientifically based research were met. For that to occur, school administrators must have the ability to "carefully weigh the available evidence on competing options and select the one that shows the best likelihood of maximizing a

valued outcome" (Coburn, Toure, & Yamashita, 2009, p. 1116). Weighing the evidence is a critical factor in evidence-based practice, but becoming an evidence-based practitioner encompasses more as it requires the integration of professional wisdom with the best available empirical evidence to make informed decisions about educational programs, products, and practices (Detrich, Keyworth, & States, 2005). Although utilizing evidence-based practice methodology as a means for making decisions is not new, in the field of education the adoption of evidence-based practice as a conventional practice has not occurred (Coburn, Honig, & Stein, 2009; Slavin, 2008). Throughout the literature in the field of education there have been indications that administrators have been hesitant to use evidence-based practice to identify programs and interventions, and several primary themes continue to rise to the surface that may, at least partly, explain the reasons for this hesitancy.

Recurring themes in current literature indicate that debates about what constitutes effective research in education, as well as questions about school administrators' knowledge of statistical methodologies and analyses, seem to be at the core of the resistance to using evidence-based practice. Further complicating the use of evidence-based practice has been the impact of the organizational structure of schools and how school administrators react to change. Most administrators acknowledged the need for organizational change, yet the school system's bureaucratic structure, coupled with the social and political culture often seen in schools, made change in school organization a difficult task (Schletchy, 2009). Yet, much of the complexity of school organization hinges on political influences outside of the school that can affect the resources available to students at any given time (Brown, 2004). These issues require a comprehensive

review to better understand why evidence-based practice has not become a customary practice in education.

Evidence-Based Practice

Evidence-based practice is the integration of empirical evidence and professional experience (Eraut, 2004; Hunt, 2003; Rubin & Parish, 2011; Smith, 2003). An ardent movement for the use of the evidence-based practice model began in the field of medicine and health care in the early 1990s, and has since spread to many other fields (Hammersley, 2004). As the evidence-based practice movement was introduced to the field of education, excitement about such practice followed the claims that the principles of evidence-based practice could be the key to making radical positive changes in education (Hood, 2003). However, not everyone shared the same excitement and some approached the practice with skepticism.

In the education arena, concerns were raised that overutilization of the terms *research-based* and *evidence-based practice* would marginalize the process to slogans and catchphrases and, rather than having implications of credibility, proclaiming a product was evidence-based would more likely be used as a way to discredit an opposing or competitive view (Hammersly, 2004). However, as evidenced by federal acts such as NCLB (2002), these concerns have not diminished the continued emphasis on utilizing evidence to guide professionals in their decision-making process. Albeit slow, the impetus for evidence-based practice and using research to guide practice in education continues. However, there is little research that addresses the use of evidence-based decision making by district-level administrators (Coburn, Honig, & Stein, 2009; Coburn & Talbert, 2006; Coburn, Toure, & Yamashita, 2009; Farley-Ripple, 2008). The limited

research concerning district-level administrators suggests the importance of looking at other professionals' use of evidence in their decision-making process. The next two sections discuss these perspectives in nursing and education, respectively.

Perspectives from the field of nursing. Education is not the only field in which evidence-based practice has seemingly had difficulty taking hold. The beginning fundamentals of what is now called evidence-based practice were found in the field of nursing over 60 years ago. As in education, many of the same feelings of uncertainty and skepticism also plagued the field of nursing; however, education and training, which resulted from continued research, has since increased nurses' use of evidence-based practice (Alspach, 2006). Many of the attitudes held by nurses that contributed to their resistance to using evidence-based practice seem to have paralleled those of educators. Due to the similarities between nursing and education concerning the resistance to using evidence-based practice, a review of the history and process used in nursing to increase the use of evidence-based practice is an undertaking relevant to possibly begin to understand education's resistance to evidence-based decision-making.

As reported by Crane (1995), a 1956 editorial, which was published for nursing managers, practitioners, and professional organizations, emphasized the importance of using current research findings in nursing daily practice (Bryar et al., 2003; Crane, 1995). Despite the ongoing emphasis and the development of numerous approaches to encourage the use of research to improve clinical practice, 20 years later studies determined that the actual use of research in nursing practice was relatively low (Bryar et al., 2003; Funk et al., 1991; Ketetian, 1975). By 1991, some 35 years after the foundational editorial, evidence use had still not become a routine process for nurses

when making decisions about practice (Funk et al., 1991). The lack of research used to make clinical nursing decisions caused concerns and resulted in studies that took a more focused look at the factors that were inhibiting nurses from using research (Bryar et al., 2003; Funk et al., 1991; Horsley, 1983; Hunt, 1981).

Studies that examined evidence use in nursing concluded that many nurses were not using research because they did not understand the fundamentals of research and were often suspicious of the findings (Bryar et al., 2003; Hunt, 1981). Other studies claimed that few nurses read current literature and even those who did were not convinced that research literature provided any practical applications (English, 1994; Funk et al., 1991; Hicks, 1995). These studies also found that some nurses reported being overwhelmed by the variations and sometimes conflicting views in research findings and felt that the research results were too difficult to interpret. Based on this information, subsequent studies were conducted to analyze the factors that led to the resistance to evidence-based practice in nursing (Bryar et al., 2003; English, 1994; Hicks, 1995; Hutchinson, 2006). These studies not only confirmed results of previous studies, but also identified several recurring themes.

The inability to evaluate research due to a lack of skill and understanding of statistical methodology and analyses was the top ranked reason many nurses were not using research evidence in their decision-making process. The second reason was the lack of time to find and read current studies to assist with decision making. The third reason reported to have a noteworthy impact on the use of research by practicing nurses was the organizational context and overall lack of support for research (Bryar et al., 2003; Closs & Lewin, 1998; English, 1994; Funk et al., 1991; Hicks, 1995; Hunt, 1981).

These were important findings as they provided a basis for examining the challenges of implementing evidence-based practice in education. Factors worthy of investigation in a school context to better understand why there has been such a struggle to utilize evidence-based practice as a common practice in education included (a) the organizational culture as it impacts evidence use, (b) the ability to understand research, and (c) having the time to interact with research.

Evidence-based practice in education. Education is a field that is entrenched in tradition and breaking away from traditional ways can be a difficult task (Rotberg, 2010). As administrators search for new interventions to improve instruction and strive to keep up with the ever increasing standards for student performance, all too often when asked about the process for improving student achievement, *That's the way we've always done it* is a vernacular often heard in public education (Jukes & McCain, 2007). This paradoxical view of looking for new results by using old methods to find them is an example of the stronghold tradition has on the field of education.

Conventional decision-making methods. Less than scientific decision-making strategies are the conventional ways school administrators have made decisions for years. Traditionally, many administrators have been known for "shooting from the hip" (Creighton, 2001, p. 52) by making decisions based on intuition and feelings, rather than decisions based on data or evidence (Creighton, 2001). Other traditional decision-making practices have been based on "ideology, faddism, politics, and marketing" with little concern or attention given to effectiveness (Slavin, 2008, p. 5). These traditional approaches to decision making have led to complications for administrators as they have no real evidence to show why an intervention was chosen or how best to track its success

(Slavin, 2008). Yet, these less-than-scientific approaches for making decisions have been deeply embedded in education. Attempts to shift to practices with an evidence perspective have left many administrators uncomfortable as many have felt it removes the individual student element from their decision-making process (Canada, 2001).

Clearly defining evidence-based practice. As stated earlier, education has not been the only field in which traditional decision making was based on factors other than evidence. Other fields have made the change to evidence-based practice; but the change has not been easy (Kowalski, 2009). The literature is replete with information about many fields and the struggles each experienced in implementing evidence-based practice. In education, a complicating factor to implementing evidence-based practice has continued to be a misunderstanding about what evidence-based practice is and how it should be used.

As explained by Kowalski (2009), the opposition to using evidence-based practice in educational decision making has been due to a lack of a relevant and clear definition. He emphasized that once the development of a clear relevant definition is complete, the implementation of evidence-based practice needs to begin with new administrators who must be taught evidence-based practice in the early stages of their administrator training programs. Additionally, he noted there must be ongoing reinforcement and support in graduate studies as well as administrator professional development if evidence-based practice is ever to become the expected practice. However, clarity on how evidence-based practice should be used in education continues to be an ongoing debate.

Attempts to find a *one best model* for evidence-based practice that could be used in all professions has been met with opposition throughout the field of education. Educators have argued that education is not the same as other professions, such as medicine, and the evidence-based practice paradigm must be adjusted to fit different professions (Howard, McMillen & Pollio, 2003). Yet, the literature supports many different professions using the same model of evidence-based practice and examples can easily be found in psychology, nursing, and social work, to name only a few (Banning, 2005; Corcoran, 2007; Hunsley, 2007; Kowalski, 2009). For administrators, absence of a clear model may well provide justification for their apprehension for evidence-based practice use, but other concerns about how administrators feel about research might also factor into why evidence-based practice is not regularly utilized in education.

Understanding and interacting with research. Philosophical views concerning research have been quite varied when it comes to school administrators. Some administrators lack an understanding of research and express an uncertainty about the research that has been reported in professional journals (Kowalski, 2009; Sarason, 1996; Stoll & Temperley, 2009). Where this skepticism about lack of confidence in professional research originated has been puzzling and leaves one to wonder if a lack of knowledge and understanding regarding research resulted in administrators feeling unsure and suspicious of research findings (Kowalski, 2009). Yet, due to federal regulations, many administrators have chosen to purchase products and interventions that claim to be evidence based. Unfortunately, many administrators have used the claims of evidence or research-based to justify a decision already made using traditional decision making methods (Slavin, 2008).

The Evidence-Based Debate

Scientific research methods and evidence-based practices have continued to be hot topics of debate in education. The debate has continued to intensify as practitioners are encouraged to use scientific research and evidence-based practice to drive educational practice due to *beliefs* that they could "serve as powerful agents for improvement, if not fundamental reform of education" (Hood, 2003, p. 4). Efforts to change how educational decisions are made have proven to be a difficult undertaking, as many administrators have discovered that making a determination about the effectiveness of a program or practice is a complicated issue (Cook, Tankersley & Landrum, 2009). Other factors such as a (a) distrust of research or (b) difficulty in finding research and applying it once found have further hampered efforts for evidence-based practice (Corcoran, 2003; Fleischman, 2006; Kohlmoos & Joftus, 2005). As a result, the field of education as a whole has been resistant to use research evidence to identify practices to enhance the quality of teaching and learning (Fixsen, Blasé, Horner, & Sugai, 2009; Fleischman, 2006; Slavin, 2008).

Some of the resistance to using evidence-based practices stems from differences in opinions about *what is and what is not* evidence of effectiveness. The lack of a clearly defined model for determining the strength of effectiveness plays an important role in the evidence-based practice debate; but, if ending the debate was as simple as developing a clearly defined model, the debate would likely be over. Instead, the complexity of evidence-based practice continues to be a factor in the hotly contested debate. The one thing that everyone seems to agree on is that the ultimate goal is to improve teaching and learning. Yet, debates between educators and researchers

regarding evidence and effectiveness are a result of opposing beliefs and perspectives concerning education and research.

On the researcher side, disparities about which research methodologies and analyses should be used and how they should be reported have been ongoing since the 1990s. On the practitioner side, the inability to understand and use research in a meaningful way to make decisions has been criticized as well. These dilemmas are at the crux of the debate indicating that evidence-based practice is much more complex than just having a clearly defined model.

Educators have been accused of not understanding research and implementing programs solely based on manufacturers' claims of effectiveness rather than thoroughly examining the evidence and making their own determination (Stone & Clements, 1998). Researchers, on the other hand, have been cited for (a) producing poor research, (b) using inappropriate methodologies, and (c) publishing studies with inadequate reporting practices (Wilkinson & Task Force on Statistical Inference [TFSI], 1999). The biases of both researchers and practitioners continue to make the advancement of evidence-based practices a difficult undertaking. The controversy between the two has sparked some fierce discussions about how evidence-based effectiveness should be determined.

Debate responses. The evidence-based debate has led to a vast response from researchers, program developers, educational organizations, and the United States Department of Education in the form of clearinghouses, lists, categories, standards, and guidelines for determining evidence-based practices (Gandhi, Murphy-Graham, Petrosino, Chrismer & Weiss, 2007). The debate has brought to the forefront questions about the criteria that should be used to determine the strength of effectiveness for

different types of research. Additionally, concerns have been noted about the quality of educational research and the methodologies and analyses that should be considered acceptable for providing evidence of effectiveness (Odom et al., 2005; White & Smith, 2002). As these differences and disagreements about research and practice have continued, if not intensified, they have affected an already sensitive relationship between the research and the education practice communities.

The tenuous relationship between researchers and practitioners in education has contributed to the all too familiar research to practice gap. Disparaging criticism from both sides has resulted in a blame game between researchers and educators (Slavin, 2002). Educators place the blame for lack of continuity squarely on the shoulders of the researchers stating they have provided ambiguous results that have been difficult to understand. Yet, the researchers have placed blame on educators, accusing them of lacking the knowledge of research and statistics required to interpret and understand their findings (Stone & Clements, 1998).

Perspectives and conceptual differences in knowledge about research in education continue to facilitate parallel factions creating striking differences between researchers and educators (Huberman, 1999). For the most part, when school administrators look to research, they are searching for a specific solution to solve a specific problem. On the contrary, researchers often have conducted research that is geared toward acquiring new knowledge to add to the overall knowledge base (Bates, 2002; Vanderlinde & van Braak, 2010). The broad knowledge-based perspective taken by many researchers has made it difficult for administrators to find the clear answers

they seek, giving rise to skepticism about what they thought the research was supposed to say (Walker, 1996).

Educators in general have been criticized for the lack of evidence used to drive their practice, but there are also questions about "the nature and value of scientific research in education" (Shavelson & Towne, 2002, p. 1). The push for reforms in research methodology and reporting practices began in 1999 with the APA Task Force for Statistical Inference (Wilkinson & TFSI, 1999) and was followed in 2002 by federal legislation that required "rigorous scientific methods for conducting education research" (Shavelson & Towne, 2002, p. 1). This was further supported in 2006, when the American Educational Research Association (AERA) published the AERA standards for reporting empirical research.

The federal legislation known as the No Child Left Behind Act (NCLB) required educators to ensure that scientifically based research was used to determine the effectiveness of programs, products, and interventions before being purchased with federal funds (NCLB, 2002). The NCLB (2002) mandate for products to be research-based spawned a frenzy of claims by producers of educational products that their products were *research-based*, all in efforts to get a piece of the federal pie (Foley, 2003). Unfortunately, many products proved to be failures, which led to concerns of conflicts of interest when the company who developed an educational product also conducted or paid for the research that claimed the product was proven effective by scientifically-based research (Stone, 2003).

Critics have claimed that research in education lacks the type of disciplinary framework seen in other professional fields (Smith, 2003; Towne, et al., 2005;

Vanderlinde & van Braak, 2010). Smith (2003) agreed that the lack of a clear framework in educational research contributed to the ongoing allegations of substandard quality and left many to hold educational research in low regard. These allegations have been disputed with explanations that research in education cannot be compared to other types of research because there is an unlikelihood that any other field has the distinct traits seen only in educational research (Towne et al., 2005). Yet, the differences in traits are unclear and researchers have provided sketchy information about the differences between educational research and other types of research. This absence of clarity has raised questions about a viable framework for educational research and brought to light concerns about the impact of educational research on educational practice (Ball & Foranzi, 2007).

Debate impact. Any sustainable impact on educational practice from the insights of research has reportedly been limited. This limited impact may in fact be the result of differences in the perspective and purpose of research held by researchers and practitioners. Researchers often focus on broad issues that may be peripheral to the concerns of practitioners, excluding a direct link to specific information about strategies that could be used to address a specific problem (Davis, 2007; McIntyre, 2005; Sabelli & Dede, 2001; Vanderlinde & van Braak, 2010). Conversely, some research studies have been highly constrained and thus have had results that do not generalize to other contexts (Sabelli & Dede, 2001). Other times, outcomes have been reported in a manner that fails to explain the process details or provide information to allow for a deep understanding of the conceptual basis for a given research project. This makes it difficult for practitioners to comprehend how such research could possibly be used to affect student achievement

(Sabelli & Dede, 2001). But researchers claim they do not have the time to generalize their findings for practitioners, explaining that the pressure to publish can greatly affect their careers (Sabelli & Dede, 2001; Vanderlinde & van Braak, 2010). Some researchers also continue to stand firm that the primary purpose of their research has been to add to the accumulation of existing knowledge and how the results of their research are transferred into practice is not their responsibility (Andrews, 2005).

Another contributing factor to the disparity in communication and purpose between researchers and practitioners has been that many researchers are writing for their peers, rather than practitioners (Davis, 2007). Differences in scholarly language and practitioner language have also resulted in confusion making it difficult to apply research to practice, leading to practitioners' suspicion of published research (Davis, 2007; Fleischman, 2006). Subsequently, while many researchers publish intensively in order to advance their careers, practitioners often fail to see their studies as useable research (Huberman, 1999).

There has been no dispute that the fundamental purpose of research has been the acquisition of new knowledge, but new knowledge should increase wisdom, which in turn should improve practice (Barkan, 1957). Improved practice should lead to the improvement of educational processes and finally an increase in student achievement as the primary outcome (Bauer & Fisher, 2007; Mortimore, 2000; Vanderlinde & van Braak, 2010). This sequence surely could produce effective ideas to improve practice, but difficulty in creating a sustainable impact on educational practice is likely due to the fact that researchers are producing research-based knowledge for other researchers rather

than practitioners who are looking for pedagogical information (McIntyre, 2005; Sabelli & Dede, 2001; Vanderlinde & van Braak, 2010).

The discord concerning educational research has resulted in strained relationships between some educational researchers and educational practitioners (Ke, 2011; Lagemann, 1997). Changes in education and the call for proven strategies in federal policy have brought to the surface the fact that there is "a deep skepticism about the quality and rigor of educational scholarship" (Towne et al., 2005, p. 11). Yet, researchers warn practitioners that all research is subject to different interpretations and that practitioners should keep in mind that research is intended to be a guide, not a destination (Davis, 2007). Efforts to minimize the disparities between research and practice should be focused on improving the nature of research by creating understanding in methodologies, analyses, and reporting practices rather than continued criticism (Davis, 2007; Towne et al., 2005).

Reform in Educational Research

In 1996, the American Psychological Association Board of Scientific Affairs (BSA) created a task force to review the controversies around the applications of statistics and the debate concerning the over-use of statistical significance testing (Wilkinson & TFSI, 1999). This task force, called the Task Force on Statistical Inference (TFSI), focused on psychological research and examined the applications of methodologies and reporting practices. Originally, the primary focus of the task force was to address the role of null-hypothesis statistical testing (NHST) in psychological research, but what resulted was a broader, more comprehensive view of statistical

methods, including the appropriateness of design and complexity of analytic strategies (Wilkinson & TFSI, 1999).

Wilkinson and the TFSI (1999) recommended that researchers use strategies that are not overly complex, yet sufficient to answer the research questions. They also recommended that researchers provide results that were "easier to communicate—to both scientific and lay communities" (p. 3). More specifically, Wilkinson and the TFSI (1999) recommended that researchers include effect sizes (ES) and confidence intervals (CI) when reporting their study results. In 2001, the 5th Edition of the APA *Publication Manual* was published and contained recommendations for researchers concerning reporting practices that were aligned with the recommendation s of the TFSI. The recommendations in the *APA Publication Manual* fell short of any endorsement for banning NHST, but recommended that researchers should report *p* values, ES, and CIs (APA, 2001). In the manual, APA (2001) did not make reporting *p* values, ESs, and confidence intervals a requirement; but, instead encouraged journal editors to support the recommendations in hopes that it would result in publications with more substantial results (Wilkinson & TFSI, 1999).

NHST and *p* values. As with any complex issue, opinions about NHST have run the gamut from getting rid of it all together to its continued use as a primary method of interpreting statistical analysis. Supporters of continued use of NHST claimed there was a time and place for NHST and contended that objective decisions were needed in the social sciences (Harrison, Thompson, & Vannest, 2009). Although staunch supporters of NHST responded to critics concerns regarding NHST, they did not provide much justification for their continued opinion to keep NHST as a primary method for

determining the worth of study results (Harrison et al., 2009). Researchers who did not take a strong stance on either side believed that NHST should not be banned, but should be used as a supplement for analysis rather than the primary focus in the interpretation of study results (Harrison et al., 2009; Kirk, 2003).

Critics of NHST, such as Kirk (2003), advised that "focusing exclusively on the dichotomous reject-do-not-reject decision strategy of null hypothesis testing can actually impede scientific progress" (p. 100) as it ignores a range of data that could have provided information about the magnitude and practical significance of the effect. However, the primary concern expressed by critics of NHST was that NHST does not provide the information researchers are seeking (Carver, 1993; Cohen, 1994). In the words of Cohen (1994), NHST "does not tell us what we want to know, and we so much want to know what we want to know that, out of desperation, we nevertheless believe that it does!" (p. 997). Cohen (1994), explained that what researchers really want to know is "Given these data, what is the probability that the H_0 is true?"; however, what it really says is "given that H_0 is true, what is the probability of these (or more extreme) data?" (p. 997). This *thinking* that a study is statistically significant based solely on NHST and an associated *p* value can give the researcher or readers a false sense of *statistical significance*; thinking you might have something when you do not or thinking you do not have something when you might.

Other criticisms of NHST, as explained by Thompson (1999), addressed "the confounded influence of the study sample size and the study effect sizes" (p. 168), which affords statistically significant results simply by having a large enough sample size. Thompson (1999) summed up the NHST concerns by identifying three key limitations of

NHST and the resulting p values: (a) "*p* values are not useful as indices of study effect sizes" (p. 167), (b) "*p* values do not evaluate result importance" (p. 168), and (c) "*p* calculated values are not informative regarding the likelihood of result replication in future samples" (p. 168). Based on Thompson's (1999) concerns, a study deemed to be statistically significance solely based on NHST cannot provide the key information needed to expand the existing knowledge base in similar literature. Results based on NHST cannot tell how much better, or worse, one intervention is than another nor can it tell the strength of the effect of an intervention (Grissom & Kim, 2005; Kirk, 2003; Thompson, 2007). Additionally, results based on *p* values perpetuates the file drawer quandary where valuable information is not added to the overall knowledge-base because non-significant results are not submitted for publication due to a cut point (*p* value) that does not take into consideration the practical significance of the study.

Effect sizes and confidence intervals. An ES can be described as a statistic that quantifies the magnitude of an obtained result or relationship (Fraenkel & Wallen, 1996; Kelly & Preacher, 2012). More specifically, an ES statistic indicates the degree to which sample results diverge from the expectations specified in the null hypothesis (Cohen, 1994; Kelly & Preacher, 2012; Vacha-Haase & Thompson, 2004). Although there are many different ES statistics, most of them fit into two general categories: measures of mean differences and measures of strength of the relation between variables (Thompson, 2006b). The measures of mean differences quantify the difference between standardized group means (Norris, 2002; Sun, Pan, & Wang., 2010), whereas the measures of strength quantify the variance accounted for or correlation between two variables (Sun et al.,

2010). Because of the large number of ES statistics, researchers need to "explicitly tell readers what effect sizes they are reporting, so that the effects can be properly interpreted and compared apples-to-apples across studies!" (Thompson, 2007, p. 424).

In the social sciences, researchers often conduct studies which involve constructs, such as self-concept, and depression, and therefore, ESs that have been standardized are often used because such constructs have no natural fixed metrics (Thompson, 2007). This type of ES is computed as the difference between the experimental group mean and the control group mean divided by some standard deviation (Thompson, 2000b), with the two most commonly used statistics being *Cohen's d,* and *Glass's Δ.* For ESs that measure the correlation or strength of the relation between variables, researchers often use, r^2, R^2, ω^2, *and* η^2 (Sun et al., 2010; Thompson, 2007; Zientek, Yetkiner, & Thompson, 2010). However, Thompson (2000b, 2007) explained that all parametric analyses are part of one General Linear Model (GLM) family of which all are correlational and consequently, variance-accounted-for effect sizes can be computed in all studies which includes both experimental and non-experimental designs.

As with many other statistics, the interpretation of ESs has not been controversy free. In 1968, Cohen proposed benchmarks of "small", "medium", and "large" when interpreting ESs as a general guide for which he invited researchers *not* to use; however, many researchers have applied the benchmarks with unyielding rigidity (Thompson, 2006b). But, we are reminded by Thompson (2001; 2006a), "if people interpreted effect sizes [using fixed benchmarks] with the same rigidity $\alpha = .05$ has been used in statistical

testing, we would merely be being stupid in another metric" (2001, pp. 82-83; 2006a, p. 198). Instead, researchers should begin by thinking and asking themselves if the effects of their study are noteworthy from a practical perspective (Glass, McGraw, & Smith, 1981; Harrison et al., 2009; Sun et al., 2010; Thompson, 1999).

The benefits of reporting ESs are clear as they quantify the size or strength of study results. An accumulation of studies that report ESs could create a literature base that provides a clearer picture of a specific treatment or intervention, as it allows for comparison of results across studies. However, no two samples are created equal, as each sample has its own unique characteristics that are not present in other samples (Zientek et al., 2010). These unique characteristics or differences in each sample result in sampling error. Although all samples will have some sampling error, studies with smaller samples, a large number of measured variables, or a small population effect size, likely will have increased sampling error (Thompson, 2000a, 2006a; Zientek et al., 2010). But, the sampling error can be estimated and quantified to gain information about the precision of the ES point estimate, by formulating a confidence interval (CI) or range of plausible values for each ES (Thompson, 2002, 2006b; Zientek et al., 2010).

Confidence intervals. There are many advantages for reporting CIs but there are also some wide spread misunderstandings about CIs, as well as technical difficulties in computing CIs for ESs (Cumming, 2011; Thompson, 2006b). Cumming and Finch (2001) outlined the following advantages of reporting CIs for ESs: CIs provide both the point and interval estimates to support understanding and interpretation; CIs support meta-analysis and meta analytic thinking; and CIs provide information about precision. Additionally, Capraro (2002) noted that CIs provide "a graphical tool to integrate or

synthesize results across studies" (p. 7). Generally speaking, CIs provide an array of information not available through NHST alone. However, studies have shown that CIs should be interpreted with caution as they can be misinterpreted.

Zientek et al. (2010) outlined three frequently occurring misinterpretations of CIs. The first misunderstanding was that "confidence intervals merely do hypothesis testing in an alternate way" (p. 427). Zientek et al. (2010) posited that this misunderstanding was due to the fact that when a CI "fails to capture zero, then indeed the null hypothesis that the parameter estimate is zero is *always* rejected" (p. 427). Cumming and Finch (2001) argued that the confusion here is that often times the CI is expressed in NHST terms. However, they explained that "understanding of CIs need not depend on NHST" as a CI can be computed even if there is no null hypothesis stated or even if the null turns out to be a wrong parameter value (Cumming & Finch, 2001).

The second misconception (Zientek et al., 2010) is the belief that, "two parameter estimates differ to a statistically significant degree if the related CIs do not overlap (which is true), but believe that two parameter estimates do not differ to a statistically significant degree if the related CIs overlap (which may be false, depending on the amount of overlap)" (p. 427). Cumming and Finch (2005) investigated the relationship between CIs and *p* values concerning the overlap of CIs and found that "95% CIs that overlap by one quarter the average length of the two intervals yield *p* values very close to, or a little less than .05" (p. 5) as long as the sample size is at least 10 and the CIs do not differ in width by a factor of 2 or more. Therefore, even when two parameter estimates overlap, it is still possible that the two parameters differ to a statistically significant degree. But more importantly, they remind us that statistical significance

means little. Many studies may not have statistically significant results, but the nature of the study still may have important information about an intervention or treatment, even if the difference is very small. Also, several studies not individually reaching statistical significance can easily give a "highly significant" combined result if "the effect sizes are reasonably consistent" (Cumming & Finch, 2005, p. 557).

The third misconception is the incorrect interpretation that a 95% CI means that the researcher is "95% certain that this specific, one confidence interval subsumes the true population parameter"(Zientek et al., 2010, p. 427). The confusion here seems to be a matter of semantics. Many misinterpret CI to mean the researcher is confident that the population parameter has been captured in their sample. However, the CI is about the statistic, not the researcher. What the 95% CI really means is that if an infinite number of random samples were drawn from the population, 95% of the CIs would capture the population parameter and 5% would not (Hinkle, Wiersma, & Jurs, 2003; Thompson, 2007; Zientek et al., 2010) .

The recommendations by Wilkinson and the TFSI (1999) to provide results that communicate to lay communities could help practitioners better understand the results of research studies. Unfortunately, implementation of the TFSI's recommendations have been slow. Findings in a 2008 study by Zientek, Capraro, and Capraro indicated that many teacher education studies continued to lack the reporting practices recommended by Wilkinson and the TFSI (1999) and AERA (2006). In another study, Belia, Fidler, Williams, and Cumming (2005) conducted a preliminary examination of 978 articles in 33 leading journals from the disciplines of behavioral neuroscience, psychology, and medicine to assess the use of CIs and standard error (SE) bars. Their findings indicated

that (a) researchers in psychology have relatively little exposure to CIs or SE bars; (b) researchers in the behavioral neuroscience discipline rarely used CIs but SE bars were often shown; and (c) the medical field routinely did report CIs but error bars were seldom seen (Belia et al., 2005). They also asked 3,944 researchers with published articles in 32 journals (21 psychology journals, 6 behavioral neuroscience journals, and 5 medical journals) to complete an interactive exercise of manipulating a graphical representation of two means with CIs or SEs to identify at what point two group means "are just significantly different" (p. 3). The results of this study indicated that "many researchers whose articles have appeared in leading journals in psychology, behavioral neuroscience, and medicine have fundamental and severe misconceptions about how CIs and SEs can justifiably be used to support inferences from data" (Belia et al., 2005, p. 9). These misunderstandings by researchers likely contributes to the slow change in reporting practices, which in turn could pose a problem for administrators and administrator training programs trying to emphasize the utilization of evidence-based practices.

Educator's Response to NCLB

In November 2002, after the passage of NCLB, the Coalition for Evidence-Based Policy (CEBP) was created to provide specific recommendations to the USDE for implementing the scientifically based research requirements. The coalition felt very strongly that using research to guide practice for educators would "bring rapid, evidence driven progress -for the first time to U. S. elementary and secondary education" (CEBP, 2002, p. 2). With this in mind, the CEBP built their recommendations on two primary

premises and recommended that the USDE utilize program, research, and evaluation funds to:

(i) Build the knowledge base of educational interventions that have been proven effective through randomized controlled trials-not just in small demonstration projects but also when replicated on a large scale; and

(ii) Provide strong incentives for the widespread use of such proven, replicable interventions by recipients of federal education funds. (CEBP, 2002, p. 18).

The CEBP (2002) advised the USDE to create an infrastructure that included a committee to carry out the efforts outlined in their report. From this committee, the coalition recommended the development of a clearinghouse with "a user-friendly, online database summarizing interventions that have been proven effective and replicable by scientifically rigorous studies" (CEBP, 2002, p. 28). As suggested by the CEBP, the Institute for Educational Sciences (IES), whose mission is to provide rigorous and relevant evidence on which educational practice and policy is based, created the What Works Clearinghouse for the purpose of reviewing existing programs and practices to determine their strength of effectiveness.

What Works Clearinghouse. Today, there are many sources of information about educational interventions, such as the ERIC, Regional Educational Laboratories, National Research and Development Centers, conferences, publications, and products (IES, 2008) with the most prominent being the What Works Clearinghouse (WWC, 2008). The WWC is powered by the Institute of Education Services (IES) and provides information about educational practices and products. The WWC's primary purpose is

to review and assess the quality of extant research. Information on the WWC website describes the WWC (2008) as, "A central and trusted source of scientific evidence for what works in education" (p. 1). Yet, the WWC has been met with opposition concerning its process and criteria used to determine the worth of the research evidence for educational programs and interventions.

As described by Wilkinson and the TFSI (1999), there are multiple forms of empirical studies "including case reports, controlled experiments, quasi-experiments, statistical simulations, surveys, observational studies, and studies of studies" (p. 594). Each of these "forms of research has its own strengths, weaknesses, and standards of practice" and when used appropriately, provide valuable information (Wilkinson & TFSI, 1999, p. 594).

The WWC's (2008) original screening and rating process for applicable programs was a classification or assignment of each program to one of three standards, which were based on the WWC's evidence criteria. Programs were "labeled" as having strong evidence-*Meets Evidence Standards,* weak evidence-*Meets Evidence Standards with Reservations,* or insufficient evidence-*Does Not Meet Evidence Standards* (WWC, 2008). These standards primarily were based on the type of methodology used to determine a program's effectiveness. The WWC outlined these processes in the WWC (2008) handbook which stated that "only well-designed and well-implemented randomized controlled trials (RCTs) would be considered as having strong evidence" (p. 11) while quasi-experimental designs (QEDs) would at best receive the weak evidence-*Meets Evidence Standards with Reservations* criterion. However, many researchers in

the field of education as well as many educational organizations were critical of the WWC's limiting the strong evidence standard to randomized controlled trials.

The randomized controlled trial requirement for strong evidence by the WWC brought about concerns from both educators and researchers alike who protested that there is no one size fits all in educational research, as different methodologies are designed to address different types of questions (Odom et al., 2005; Shavelson & Towne, 2002). Although, the WWC recently expanded the realm of possible acceptable research methodology to include regression and single case designs, it still considers randomized controlled trials as the gold standard for the strong evidence of effectiveness category (WWC, 2008).

Concerns have been expressed by professionals in different areas in the field of education regarding research methodologies used in studies for their particular group, as randomized controlled trials are not always suitable for their population. Research methodology and analysis that constitute quality research for different populations or subgroups in education have resulted in some subgroups, such as special education, providing their own indicators of high-quality research (Odom et al., 2005). These concerns have spurred a rash of task forces, supported by various educational organizations conducting studies aimed at developing procedures, to rate and identify acceptable evidence for their specific discipline (e.g., special education, counseling, school psychology).

Council for Exceptional Children. The Council for Exceptional Children (CEC) was one case in point. A task force created by CEC to address the evidence-based dilemma, as it applies to special education, asserted that "different types of research

questions are important for building and documenting the effectiveness of practices" (Odom et al., 2005, p. 138). In contrast to the WWC standards, subcommittees of the CEC Task Force expanded the realm of quality indicators of research methodologies beyond mere randomized controlled trials, looking at how various methodologies can be used to understand effective practices (Odom et al., 2005). This task force set out to create guidelines for identifying evidence-based practices by establishing indicators for research methodologies that are commonly used in special education (Odom et al., 2004).

School psychology. Another task force established to address the research dilemma was created by the Society for Study of School Psychology. This task force developed a system for coding and describing multiple aspects of research studies (Kratochwill & Stoiber , 2002). The primary outcome of this task force was the development of the Procedural and Coding Manual for Reviewing Evidence-Based Interventions. Yet, unlike others, the task force did not develop rating or ranking standards but instead provided guidance in the form of a 25 page coding protocol for data collection, to allow practitioners to "draw their own conclusions based on the evidence provided" (Kratochwill & Stoiber, 2002, p. 360). The School Psychology Task Force also cautioned that no research study can take into account all contextual and ecological variables when evaluating whether a program or practice is likely to be effective in a particular school or setting.

Purpose, Perspective, and Perception

The three examples already mentioned are only a small sample of the many entities that have created lists, ratings, coding protocols, and continuums that are

designed to assist in identifying sound evidence-based practices. Yet they illustrate how different entities each have their own purposes, perspectives, and perceptions of sound evidence, all of which vary in fundamental ways. These differences have resulted in a multitude of informational sources that add to the confusion and frustration that some school administrators already felt when trying to determine evidence-based effectiveness. These variances in identification of evidence of effectiveness, along with inconsistencies in reporting practices have led to discrepancies and gaps in evidence and research-based information, make the identification of effective interventions all the more difficult for school administrators (Slavin, 2008).

Educators as a whole have been criticized for implementing programs solely based on claims of scientifically based research and marketing techniques rather than thoroughly directly examining the evidence to determine if a program or practice truly has been proven effective (Slavin, 2008; Stone & Clements, 1998). But educators need guidance to be able to determine the effectiveness of educational programs and practices. The many resources that have been available, such as WWC, provided information about programs and interventions but criticism continued concerning differences in theoretical and empirical approaches to determining the efficacy of various interventions (Schoenfeld, 2006).

The overabundance of varied research information left many educators and administrators feeling as if there are not enough hours in the day to read all the research (Gordon, 2010). Changes in the financial state of education exacerbated the problem and resulted in more duties causing time restraints that made it even more difficult for administrators to use evidence in substantive ways. Increased administrator

responsibilities left less time to search for new or novel solutions and less time to engage with evidence and colleagues in ways that encourage and enable them to rethink their assumptions and develop shared understandings (Coburn, Toure, & Yamashita, 2009). Past practices, coupled with limited skill or experience in using research to identify effective interventions, leaves administrators adopting programs or products that have not necessarily been proven effective (Cook, Campbell, & Day, 1979; Rothman, 2005)

Critical consumers of research. Achieving the belief that evidence-based practice could result in substantial improvement in American education has been dependent upon the ability of practitioners to become critical consumers of research (Hood, 2003). The ability to analyze research permits practitioners to critically examine the evidence on interventions and practices. A thorough examination of the evidence allows administrators to ground their decisions on evidence, leading to improved student achievement (Honig & Coburn, 2008).

Choosing credible research has been, to an extent, a matter of understanding the educational purpose, perspective, and perception from which a particular piece of research originates. Competing and contradictory findings have been common in behavioral science research which has presented major challenges for practitioners as they must (a) first be able to discriminate between the credible and unreliable and the important and unimportant evidence and (b) then be able to apply their findings to the need they are trying to address (Stone & Clements, 1998). However, many administrators feel their lack of sophistication in acquiring, interpreting, and applying research leaves them no choice but to seek answers from colleagues within their

organizations, rather than from their own analysis of the research (Nelson, Leffler, & Hansen, 2009).

The problem is often further complicated by skilled presenters expounding their products under the auspices of promising huge gains in student achievement. Subsequently, administrators purchase programs based on a crafty presentation having never even directly seen any research evidence (Stone, 2003; Stone & Clements, 1998). Conflicting opinions regarding the value of some educational research has led to continued controversy about what constitutes strong research evidence and because all interventions are not created equal, some interventions are more likely than others to positively affect student outcomes (Forness, Kavale, Blum, & Lloyd, 1997). Consequently, these factors mean improvement in student achievement will require administrators to be statistically literate and know what to look for as evidence of effectiveness; such as, an appropriate research design, methodology that produces meaningful results, and the magnitude of effect (Cook, Tankersley, & Landrum, 2009).

Statistical literacy. In general, people usually believe what they hear or read and many often go along with whatever seems to be in style, often placing their trust in marketing claims (Walker, 1996). Since the enactment of NCLB (2002), many educational products have carried the "research-based" stamp but often the manufacturer or producer of the product also conducted the research. As previously noted, bias has been of great concern when companies conduct their own research and then use their results as a selling point (Stone, 2003). Administrators who lack the skills to scrutinize research and critically review the results have been in jeopardy of choosing a product or program that may not be right for their schools. A basic understanding of statistics is

essential to avoid reliance on manufacturers' claims. As noted by Konold and Higgins (2003), "Probably no skill is more important to acquire in the battle for equity [in schools] than statistical literacy" (p. 193).

As the emphasis on research and evidence-based practice has continued to rise, the need for administrators to be skilled in interpretation of research has become more prevalent. However, administrator knowledge of research and statistics has been a concern for many years. For example, in 1966 Katzenmeyer conducted training for school administrators called the "School Administrator Institute for Educational Research." The institute's objectives were threefold: "to heighten the research interest of practicing school administrators" (p. 2), "to enhance the research skills of practicing school administrators" (p. 3), and "to provide information about the recent developments in educational research" (p. 3) (Katzenmeyer, 1966). The basic premise of the Katzenmeyer (1966) study was to make administrators better consumers of research with the hopes that as they became more familiar with research they would also be more likely to engage in research and allow researchers to conduct studies in their schools.

Statistical literacy encompasses the knowledge of basic research concepts, such as sampling, bias, and representativeness, as well as the ability to ask critical questions about the statistics presented in research (Schagen, 1998). The following examples of the types of questions that all administrators should keep in mind when reviewing educational research were provided by Schagen (1998):

- Who produced these statistics? Do they have an axe to grind?

- What's the sample on which they are based? Is it representative of the population we want to know about?
- What are the response rates?
- Are there sources of bias in the data?
- Are they confusing correlation with causality?
- What is the measure that is used? Is it measuring what we think it is? (p. 21)

These basic questions outlined by Schagen (1998) are just the tip of the iceberg, but they do provide a starting point to help administrators think as they read research in their efforts to make a determination about its meaningfulness. Without such guidance, administrators who lack a clear understanding of research are left unable to differentiate the good research from the bad (Walker, 1996).

Strasser (2007) agreed with Schagen (1998) and Walker (1996) concerning the importance of understanding data and data analysis. Strasser (2007) stated that those who do not have a good understanding of research tend to believe what is reported and usually assume that the statistics are true. However, as Strasser (2007) pointed out, "statistics are led by subtleties and various interpretations can be both right and wrong" (p. 51). These perspectives highlight the need for a basic understanding of research methodology and analysis to verify research strength and identify the key research elements such as population, sample selection and size, statistical assumptions and perspective of the researcher. Strasser (2007) also noted that how data are presented can be misleading as data interpretation can be subject to flaws. Understanding research and

the meaning of the results ensures that the results of the research are pertinent to the administrators' problem and population.

Many school administrators lack some of the fundamental skills needed for understanding statistical processes. Many do not have the ability to frame questions in a way that data can be aggregated and disaggregated to answer, nor do they have the knowledge to select the right statistical procedures to answer their question. Yet, even more critical has been a lack of awareness concerning how statistical techniques operate in a conceptual sense (Carroll & Carroll, 2002). Although evidence-based practice does not require administrators to be statisticians or researchers, evidence-based practice does require the ability to match the research to the problem, population, and the question at hand.

The use of data to frame questions. In school districts today, school administrators disaggregate, aggregate, and analyze student achievement data regularly (Kadel, 2010; Park & Datnow, 2009; Wayman, 2005). The emphasis on data-driven decisions requires effective leaders who are able to use student achievement data to identify instructional and programmatic needs (Kadel, 2010; Park & Datnow, 2009). Unlike 20 years ago, when some recommended that administrators make decisions based on *intuitive leadership* and trusting *gut feelings* (Norris & Achilles, 1988), today's administrators must understand and use student data and research to improve teaching and learning. For most administrators, the extent of their experience in analyzing data is in aggregating and disaggregating student assessment data in school based systems. For the most part, administrators are proficient at collecting, aggregating, and disaggregating standardized test scores, benchmarks, and individual student achievement

records, to identify areas of need (Datnow, Park, & Wohlstetter, 2007; Marsh, Pane, & Hamilton, 2006; Park & Datnow, 2009). Analyzing student information provides administrators with opportunities to use data such as frequency counts of raw data and the averaging of test scores, but stops short of the type of analysis needed for evidence-based practice. Although these statistics have been useful for providing information about strengths and needs on many levels they do not always provide the answer to a student achievement problem (Carroll & Carroll, 2002).

The purpose of collecting and analyzing student achievement data provides administrators with information needed to identify the strengths and needs of students, campuses, and even the district as a whole. Information garnered from such data provides administrators with important information to allow them to frame questions needed to identify an instructional or programmatic problem that may be negatively impacting student achievement. Yet, collecting and analyzing student data does not identify a proven effective intervention, program, or solution needed to address the identified problem. Answering the questions and finding a solution means analyzing the research to identify a program or practice that will meet the identified need and result in the highest probability of increasing student achievement (Jenkins & Kerrigan, 2008).

The stir caused by scientifically-based research and evidence-based practice probably would have been negligible if it were more readily understood. Resistance to becoming evidence-based practitioners may have been minimized if administrators had received more relevant training in research and design with more opportunities for real application (Carroll & Carroll, 2002). Unfortunately, most research and statistics classes in administrator training programs leave administrators feeling uneasy about statistical

procedures, analysis, and interpretation. Many administrator trainings leave them ill-equipped to bridge the gap between identified student achievement problems and the identification of evidence-based interventions to determine a likely solution (Bliss &Tashakkori, 2001). Yet, Bliss and Tashakkori (2001) noted that even those who did not major in statistics should be able to choose appropriate analytical methods for specific sets of data based on the research question and have the ability to interpret the results. Nonetheless, as expectations for administrators to aggregate and disaggregate student data continue, making the shift to evidence-based practice requires the support from the school organization as a whole.

Organizational context. The literature concerning organizational structure of schools and resistance to change is extensive (Fullen, 2007; Hargreaves & Shirley, 2009; Marzano, Zaffron, Zraik, Robbins, & Yoon, 1995; Schlechty, 2009). Traditionally, public school systems have been described as inherently passive, institutionalized, and ritualistic, thus making change of any kind difficult (Schlechty, 2009). The bureaucratic structure of school systems typically lack flexibility and often function best when there are routines and the work is relatively well known (Schlechty, 2009). The lack of flexibility and the predictability of routines result in school organizations that lack creativity and fail to see the value in changes of any kind (Schlechty, 2009). Organizations such as these find comfort in the predictability within the hierarchical structure of the system and have often resulted in skepticism and resistance toward research, evaluation, and testing (Kean, 1983; Senge, 2006).

At one time, efforts to build evidence-based cultures in schools were believed to be hindered by difficulties in accessing research (Corcoran, 2003). Today however,

many resources, such as scholarly journals, are readily available through the Internet. Yet, many central office administrators might have difficulty discarding old decision-making practices that were based on how well an intervention or program was liked versus research that supported its effectiveness (Corcoran, 2003). Other complications that have plagued schools concerning decision-making processes is the bureaucratic structure with multiple policies and procedures that slow efforts to change.

Efforts to change the bureaucratic nature and organizational structure of schools appear to be ongoing. The criticisms concerning the gap between the teaching and research, the relevance, applicability and quality of educational research, and the effective dissemination of research continue to be influenced by the structure of schools (Hargreaves, 1996, 1997; Hillage, Pearson, Anderson, & Tamkin, 1998). Lack of support to use research and resource constraints make it difficult for administrators to use evidence in substantive ways. Additionally, administrators have less time to search for new or novel solutions and less time to collaborate with each other in ways that encourage and enable them to rethink their assumptions and develop shared understandings. Conversely, supportive executive leadership contributes to evidence use by bringing new ways of framing problems and solutions and determining levels of inclusiveness in the process (Coburn, Toure, & Yamashita, 2009). Ultimately, evidence use requires structures that enable people throughout the central office to engage in deliberation and debate, as well as to encourage and enable administrators to engage with evidence in substantive ways that lead to sound decisions that, will in turn, improve student achievement (Coburn, Honig, & Stein, 2009).

Evidence-based decision-making. Decision-making can be a complex task. Determining which decision-making process to use can be overwhelming. There are decision-making procedures for choosing the right decision-making process needed for a specified type of dilemma. Determining the type of decision model needed for specific problems can also be overwhelming, as a simple Google Internet search using the key words "decision-making process" found 89,900,000 results for various studies, reports, research, software, training, and procedures containing flow charts, diagrams, and graphs that outline strategies for making decisions. Yet, simplistically stated, decision making is a process where a choice is made between two or more alternatives. A study by Keller and Yang (2008) described two basic dimensions or stages of decision making. The process they describe begins with screening possible alternatives to remove those options that are not plausible. The second step is based on an approach where the decision maker examines the costs and benefits of the remaining options.

Administrators are regularly faced with the type of decisions that encompass a multitude of choices, all claiming to be evidence-based, making the decision process very complex. For school administrators, the ability to reduce options by removing those that are not plausible requires some basic understanding of research and statistics. However, the methods used by administrators to make decisions have been varied due to differences in experience, knowledge, and skills. Recent studies concerning administrator decision making shows that administrators rarely use research in their decision-making process (Coburn, Honig, & Stein, 2009; Coburn & Talbert, 2006; Coburn, Toure, & Yamashita, 2009; Fleischman, 2006).

The need for evidence-based practice, and thus evidence-based decision-making in education seems clear. The objective of evidence-based practice is to ensure that future research in education meets the criteria of scientific validity, high quality, and practical relevance that has sometimes been lacking in existing evidence on educational activities, processes, and outcomes (Hargreaves, 1996, 1997; Hillage et al., 1998). The objective of evidence-based decision-making is to provide a systematic approach to investigating and analyzing available research evidence to make informed decisions (Davies, 1999). The ability of administrators to become proficient at using evidence for decision-making purposes might best be accomplished by having administrators plan, carry out, and publish studies that meet the highest standards of scientific research. This would lead to the ability to evaluate the appropriateness of data analysis strategies in reports of empirical research that appear in the literature (Bliss & Tashakkori, 2001). Such activities might also develop an understanding of data analysis and research methodology that would provide the basis for the effective implementation of an evidence-based decision-making model. However, such endeavors have to be supported by the organization, as the organizational context of the district can positively or negatively influence the use of research (Young, 2006).

Barriers to evidence-based practice. One could conclude from the literature that there are many possible barriers to the implementation of evidence-based practice in any professional field. The studies directly related to evidence-based practice in education have been limited, yet one can garner from the literature specific barriers that affect the implementation of evidence-based practice in any field. Currently, literature concerning evidence-based practice in both education and other fields offer similar

themes regarding apprehension in implementing an evidence-based practice decision-making model.

In a broad sense, the culture and characteristics of an organization contribute to the use of evidence-based practice, as the organization and its leaders can either encourage or discourage decision-makers to utilize an evidence-based approach to decision-making (Kowalski, 2009; Rogers, 1983; Young, 2006). In addition, the characteristics of individual decision-makers can affect the utilization of evidence-based practice. For example, individual characteristics of the decision-maker's background concerning training, education, and experience can affect how, or if, an individual uses evidence-based practice when making decisions. But, the most prominent concern seems to involve school district administrators' knowledge and abilities to use research evidence in substantive ways. This is a critical factor considering the concerns about how study findings are reported, especially when coupled with disagreement on a clear definition of what evidence-based practice is and what it is not. This present study examines central office administrators' evidence-based practices and the factors that influence their decision-making practices.

CHAPTER III

METHODOLOGY

The preceding review of literature brought to light the purpose, the tradition, and the reality of evidence-based practice in education today. To date, studies conducted to determine how central office administrators in public schools use research in their decision-making process have been qualitative case studies that were conducted in a single school district or a small sample of 3 to 4 districts (Coburn, Honig, & Stein, 2009; Coburn & Talbert, 2006; Coburn, Toure, & Yamashita, 2009; Honig, 2003). The present study takes a much broader quantitative approach by examining the relationship between administrators' self-confidence concerning statistical methodology and analysis, knowledge of evidence-based practices, beliefs about research, and evidence use in decision-making practices. Data were collected through survey methodology and quantitative methods were used to analyze each of the following research questions.

Research question I: To what extend does administrators' (a) *Knowledge*, (b) *Beliefs* and (c) *Self-Confidence* concerning statistical methodology and analysis predict administrators' perceptions of their evidence-based decision-making practices?

Research question II: To what extent can central office administrator's individual characteristics of education, experience, and employment predict their perceptions of their evidence-based decision-making practices?

Research question III: To what extent can central-office administrators' individual school districts' characteristics such as type (rural, suburban, urban), size, geographic region, and policies predict their perceptions of their evidence-based decision-making practices?

Research question IV: At what administrator level are the evidence-based decision-making practices decisions made?

Instrumentation

An Internet-based electronic survey was developed to gather data for this study. Internet-based surveys provide a cost effective means for distributing large numbers of surveys over a large area, with rapid replies, and computer-assisted data collection (Cook, Heath, & Thompson, 2000). Yet, the attractiveness of Internet-based surveys does not negate uncertainties about low response rates or concerns about representativeness (Cook, Heath, & Thompson, 2000; Sax, Gilmartin, & Bryant, 2003). Strategies such as pre-contacts, reminder contacts, and contacts that are personalized have been associated with higher response rates (Cook, Heath, & Thompson, 2000). Other strategies, such as, interest in the topic of the survey and incentives, has shown to have little to no impact on web or Internet-based survey response rates (Cook, Heath, & Thompson, 2000).

Instrument. The survey instrument used in this study was divided into four sections containing a total of 48 questions. The first section contained 10 multiple choice questions designed to collect data about the participant completing the survey, including basic demographic information, current employment, education, and experience. Section two contained 5 multiple choice questions regarding the district where the

participant was employed. Data concerning the size, geographic location, and basic decision-making policies of the district were collected to provide a better understanding of the structure of the district. Section three contained 17 scaled response questions regarding use of evidence-based practices in decision-making. A six-point scale ranging from 1 (Not Like Me At All) to 6 (Just Like Me) was used to determine evidence-based decision-making practices. Questions in this section were "I" statements and the participants were asked to rate their agreement with each statement. The primary instrument used in developing this section was the Evidence-Based Practice Questionnaire (Upton & Upton, 2006). This instrument was selected because it contained the constructs of attitudes, or *Beliefs,* toward research and use of evidence-based practices that this study sought to examine. The 16 questions in the fourth section utilized current literature and questions from the Current Statistical Self-Efficacy instrument (Finney and Schraw, 2003) to identify the administrators' level of self-confidence for understanding and interpreting basic research and statistical procedures. A six-point scaled response ranging from 1 (No Confidence At All) to 6 (Completely Confident) was used and participants were asked to rate their level of confidence regarding a specific statistical function.

Survey items. The survey for the present study was developed to measure the evidence-based decision-making practices of central office administrators and the factors that influence their evidence use. Previous studies have been conducted and survey instruments have been developed to measure the degree to which practitioners in other fields use evidence-based practices. To date, there is no instrument that has been

developed in an educational context to obtain information on central office administrators' use of evidence-based practices.

Survey items intended to measure evidence-based practices in decision-making in the present study were based on the Evidence-Based Practice Questionnaire (Upton & Upton, 2006). Although the Evidence-Based Practice Questionnaire addresses knowledge and skills of evidence-based practice, it did not address the specific statistical literacy needed to understand and interpret research. The present study sought to further examine the implications of evidence-based practices on decision-making and the effects self-confidence in statistics has on evidence use. To measure administrators' self-confidence in statistics the *Current Statistics Self –Efficacy* (CSSE) instrument developed by Finney and Schraw (2003) was used.

Participants

The structure and hierarchy of central office administrators in public schools can vary from district to district, yet the emphasis for administrators to use evidence-based practices has spanned widely across district central offices (Honig & Coburn, 2008). Beyond the emphasis for evidence-based practices has been the underlying requirement for using evidence that stemmed directly from IDEIA and NCLB federal grants. Because of federal grant requirements for using research evidence, participants for the present study were chosen because they were central office administrators who managed their districts' IDEIA and/or NCLB federal budgets. An important note to make is that throughout the study the budget managers are identified as central office administrators, yet in small districts the administrator might not be located in a central office of a district. Although based on location, these administrators are not *central office*

administrators; however, if they managed a federal budget they were included in the participant list irrespective of their actual location.

Sampling procedure. A non-probability purposive sampling approach was used to identify the participants for this study. Purposive sampling is used when there is a purpose for which the sample is chosen or when there is a predefined group that is being studied (Huck, 2000). From all central office school district administrators in the state of Texas, only the administrators who managed a federal budget for their school district were included in the participant list.

Participants were identified from the Texas Education Agency's *AskTED*-Texas Education Directory website (Texas Education Agency, 2012). The AskTED website provides a personnel directory for the Texas Education Agency, regional service centers, public schools, and charter schools. The entire directory or specific reports could be downloaded from the directory website. The site also offered a search utility to narrow the scope of the personnel information. Using this utility, a list of superintendents, special education directors, and NCLB-state and federal programs directors was obtained. With the exception of some missing data, the list included names and contact information, such as phone numbers, mailing addresses, and email addresses for all of these administrators throughout the districts in the state. Information from district websites, regional service centers, or phone calls were used to complete the personnel listing for districts with missing data. This search produced 1,244 public and charter school districts within the state of Texas.

Participant criteria. Criteria for inclusion as a participant was based on employment in a public school district in the state of Texas and management of a federal

budget (IDEIA or NCLB) as part of the requirement for the position held. Three participants from each school district, one for each federal budget (IDEIA and NCLB), and the superintendent were included in the participant list for this study. In some districts if an administrator managed both the IDEIA and NCLB budgets, that person was listed only once in the participant list, which could have resulted in the district having only one participant on the list.

Texas Education Agency database. Based on district websites for school districts throughout the state, the actual job titles varied for similar positions. For example, the job title for the special education director might be the director of special services, director of instructional support programs, director of student services, or another director title. However, the Texas Education Agency database, the AskTED directory, used the title of Special Education Director as the individual identified as supervising a district's special education program (Texas Education Agency, 2012). This was also true for the NCLB-state and federal program directors who were sometimes identified as the state and federal program director, student support services director, or another director title, but again, they were identified as the NCLB-state and federal program director in the AskTED directory database. Additionally, some superintendents were identified as superintendent, acting superintendent, or interim superintendent. All of those could be included in the participant list. However, only one special-education director and one NCLB-state and federal program director per school district was included in the participant list. Superintendents were included in the survey if they managed one or both of the federal budgets.

Excluded from the participant list were public charter schools. Charter schools in Texas are considered to be public schools and are governed by the Texas Education Agency. Public charter schools do receive federal funds; however, due to the differences between public school districts and charter school funding structures and organization, which is beyond the scope of this present study, charter schools were removed from the participant list.

The original AskTED database search identified 1,248 superintendents, 1,253 special education directors, and 1,262 NCLB-state and federal program directors. As a result of the removal of the charter schools, there were 1,027 superintendents, 1,042 special education directors, and 1,048 NCLB-state and federal programs directors. There were inconsistencies in the number of districts to superintendents and directors due to some directors being listed in both director lists and large districts having multiple directors and executive directors as well as superintendents and area superintendents. In selecting participants for this study precautions were taken to avoid duplication of participants. Of the 1,040 school districts in Texas, there are 700 districts that have less than 1,000 students in the entire district. Many of these small districts share services, such as special education, through cooperatives or shared service arrangements (SSA). Other small districts choose to have their central office administrators coordinate or manage multiple programs. There are even some districts where the superintendent might also serve as the director for multiple programs and manage the federal budgets for the district. These situations were taken into considerations, and to avoid duplication of participants, the lists from both federal programs (IDEIA and NCLB) and the superintendent list were merged and duplicates removed.

Information concerning the number of cooperatives and shared services arrangements throughout the state providing special education services was also obtained through the AskTED website. Currently, there are 112 cooperatives or SSAs that provide special education services to a total of 611 districts throughout the state. A list of cooperatives and SSAs with the districts in which they serve was compiled and the director of the cooperative or SSA was identified. The special education director in the district which serves as the fiscal agent for the cooperative or SSA usually serves as the special education director for each of the member school districts. To avoid multiple surveys being sent to each director of a cooperative or SSA, the director of the district that was identified as the fiscal agent remained on the participant list as the other member districts did not have a director. If there was an additional director identified by a member district in addition to the fiscal agent, the director chosen to participate was determined based on who managed the cooperative's or SSA's federal budget.

The AskTED search for NCLB-state and federal program directors, with charter schools removed, resulted in 1,048 districts with NCLB-state and federal program directors; however, there were several missing names. Additionally, when the superintendent, special education director, NCLB-state and federal program director lists were merged, there were many duplicates. Many of the NCLB-state and federal program directors were also identified as the superintendent or the special education director for the district. To complete the list and ensure the most accurate personnel information, district websites and the regional service centers were consulted to complete the list which resulted in a list of 2,192 participants.

CHAPTER IV

RESULTS

The review of literature for this study addressed the controversies over the worth and quality of research in the social sciences. For some, only the results of studies that employed a true experimental design with randomized controlled trials were held in high regard (WWC, 2008). However, randomized controlled trials are not always possible. There are other types of studies, such as correlational studies, that can be used to obtain valuable information about the relationships between variables. As Thompson, Diamond, McWiliam, Snyder, & Snyder (2005) explained, correlational studies are "quantitative, multi-subject designs in which participants have not been randomly assigned to treatment conditions" (p. 182) and although results may not provide definitive causal evidence, results can be used to inform evidence-based practices.

The previous chapter explained the sampling procedures, described the development of the survey instrument, and the data collection procedures. This chapter includes preliminary analyses that investigate the sample representativeness, as well as the reliability, and validity of the data. Then, the primary analyses are presented: the exploratory factor analysis, ANOVA, and multiple regression analyses that address each of the research questions.

Preliminary Data Analyses

Information about the population was obtained through the AskTED directory. Reports generated through the AskTED directory provided information about the district

size and location as well as information about central-office administrators. Demographic information was also obtained through the TEA website and individual district websites.

Missing data. Missing data in the social and behavioral sciences is not unusual; however, it is essential that researchers address missing data. Best practices call for researchers to clearly outline the extent and nature of the missing data and provide readers with the procedures used to manage the missing data (Schlomer, Bauman, & Card, 2010).

The data in the present study were examined for missing data. Of the 305 responses to the survey, 18 were removed from the study because the respondent did not answer any of the questions, leaving 287 survey responses. Further examination of the data showed that 19 respondents completed the questions concerning demographic information but did not answer any questions about their evidence-based decision-making practices or statistical self-confidence. These survey responses were also removed from the study because they did not provide adequate data; resulting in 268 surveys with data to be analyzed. Of the 268 remaining responses, 9 were missing the answer to one question in the statistical self-confidence section. Because these responses were complete with the exception of a single question, composite scores were created for each respondent by averaging either 8 or 9 responses in the statistics self-confidence section of the survey. Finally, there were 8 respondents that answered every question but stopped when they came to the section on statistical self-confidence.

It could be hypothesized that respondents who answered all of the questions and ended the survey when they reached the statistical self-confidence questions might not

have been confident in their abilities to understand many of the statistical analyses identified in the survey. However, because these 8 surveys were complete with the exception of the last section concerning statistical self-confidence, it was decided not to remove them from the study as they still provided information about the sample and the use of evidence-based decision-making practices. Therefore, the statistical self-confidence data were analyzed separately and the 8 responses were removed from the statistical self-confidence model. As a result, administrator characteristics, district characteristics, and evidence-based practices data were analyzed with a sample size of 268 (n = 268) and statistical self-confidence data were analyzed with a sample size of 260 (n = 260).

Sample demographics. The respondents in this study were public school district administrators in Texas who managed a federal budget. Figures 1 through 8 provide an overview of the profile indicators used to describe the sample.

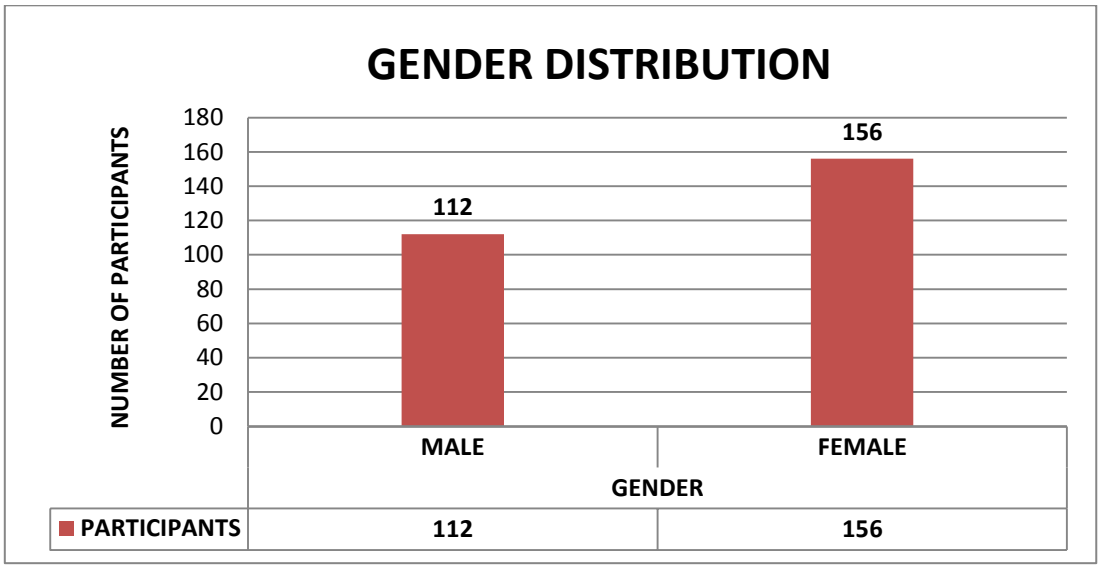

Figure 1. Distribution of sample gender (n = 268).

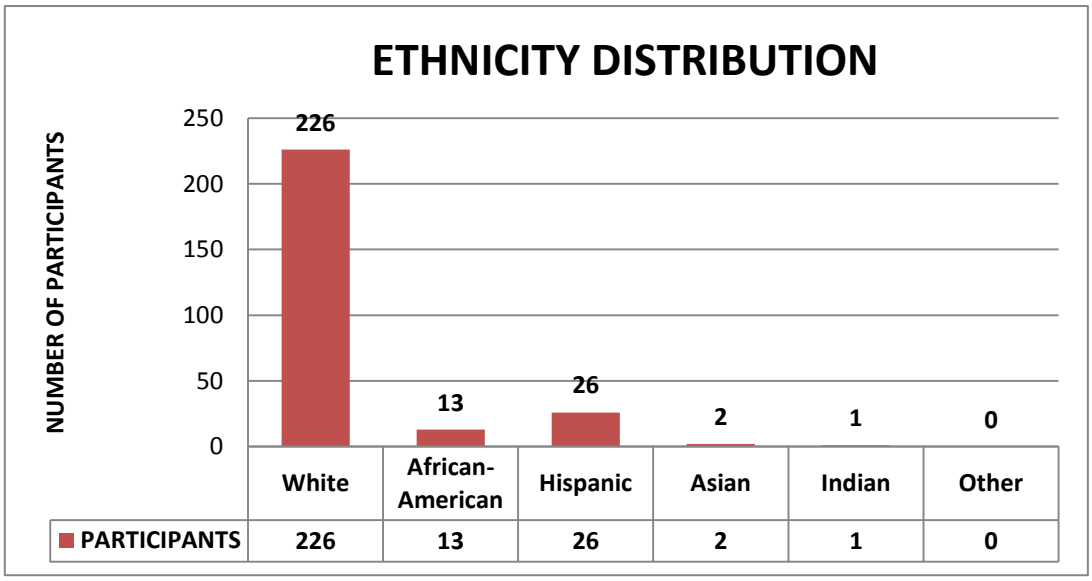

Figure 2. Distribution of sample ethnicity (n = 268).

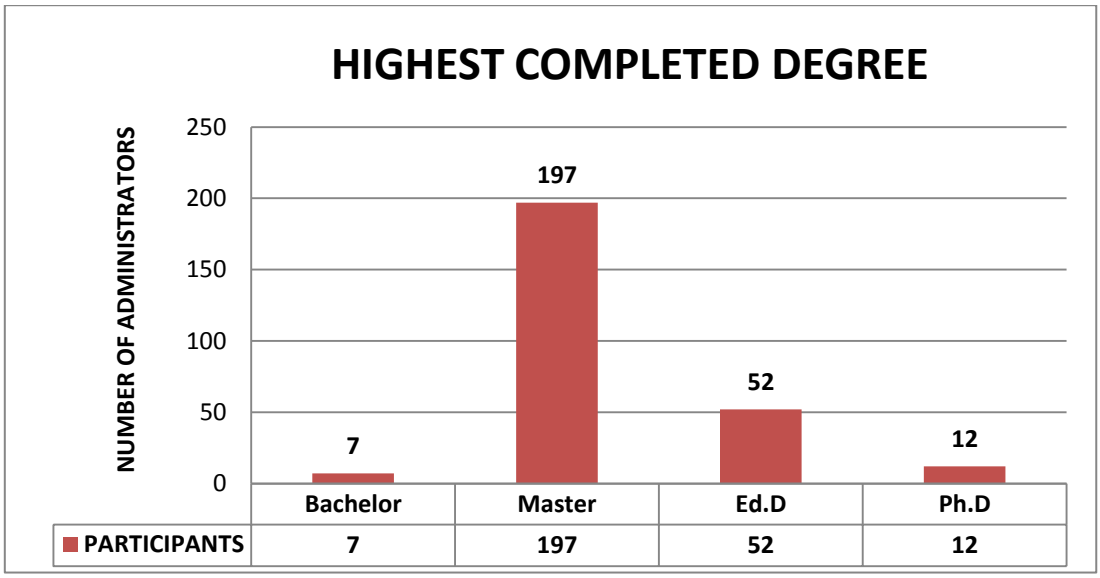

Figure 3. Distribution of highest degree completed by central office administrators (n = 268).

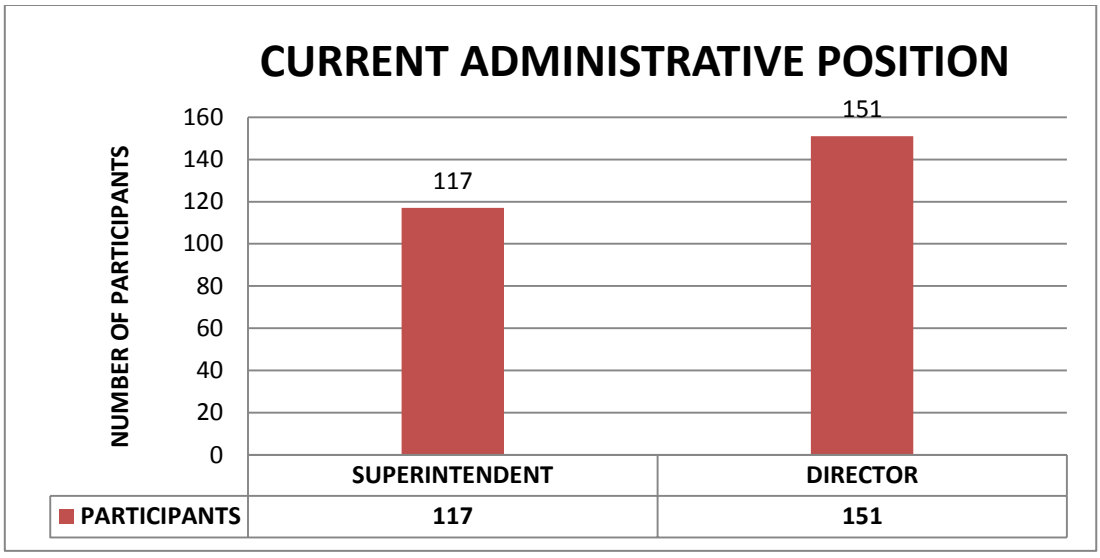

Figure 4. Distribution of the postion currently held by respondents (*n* = 268).

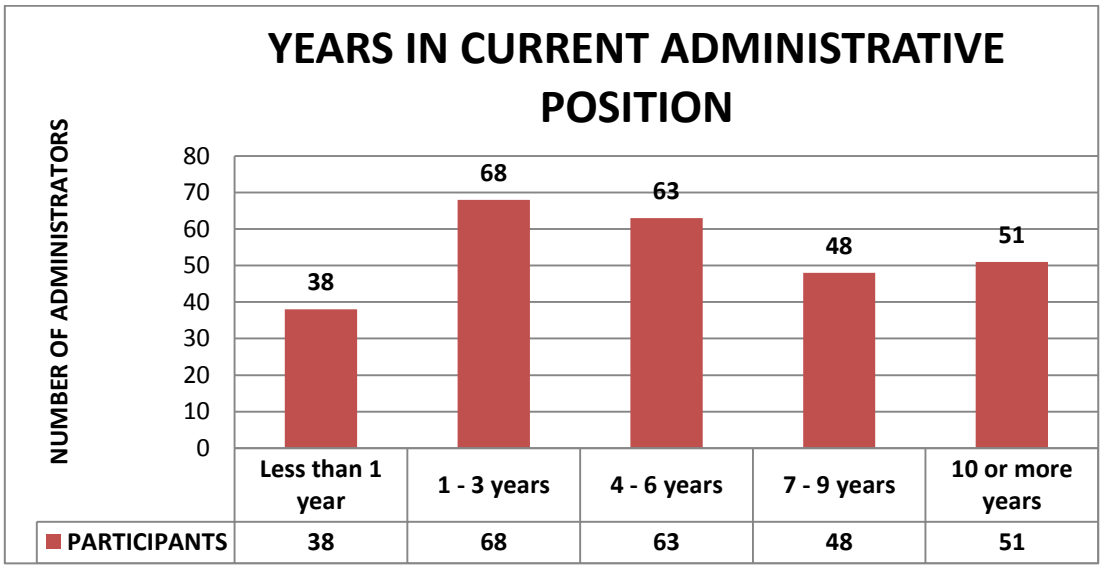

Figure 5. Distribution of years of experience in current administrative position (*n* = 268).

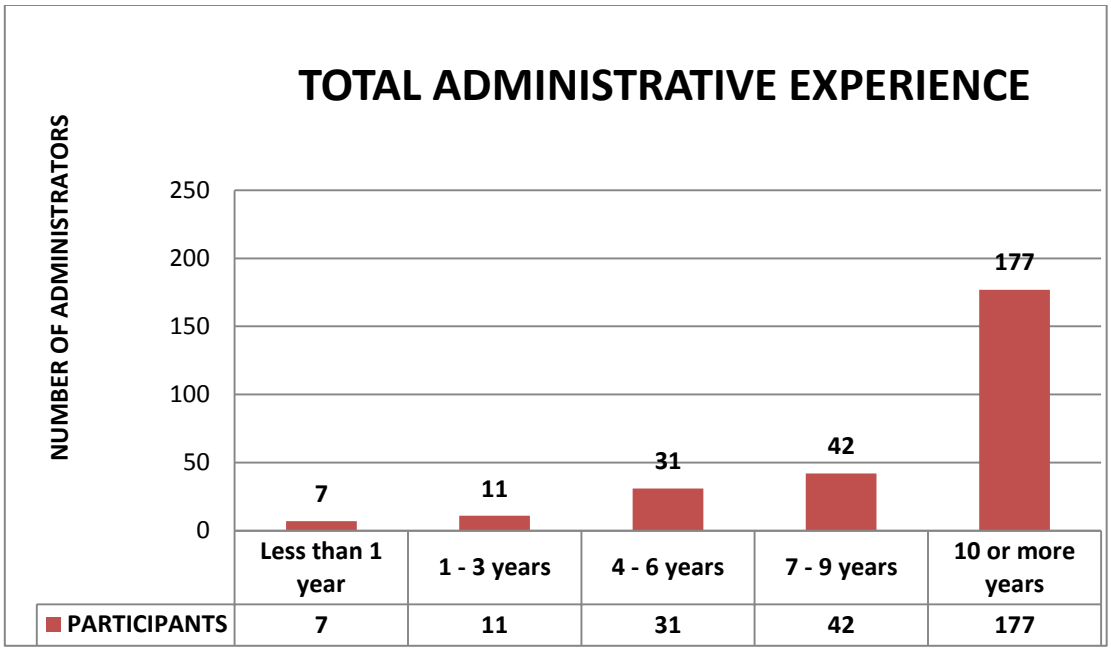

Figure 6. Distribution of the total years of administrative experience (n = 268).

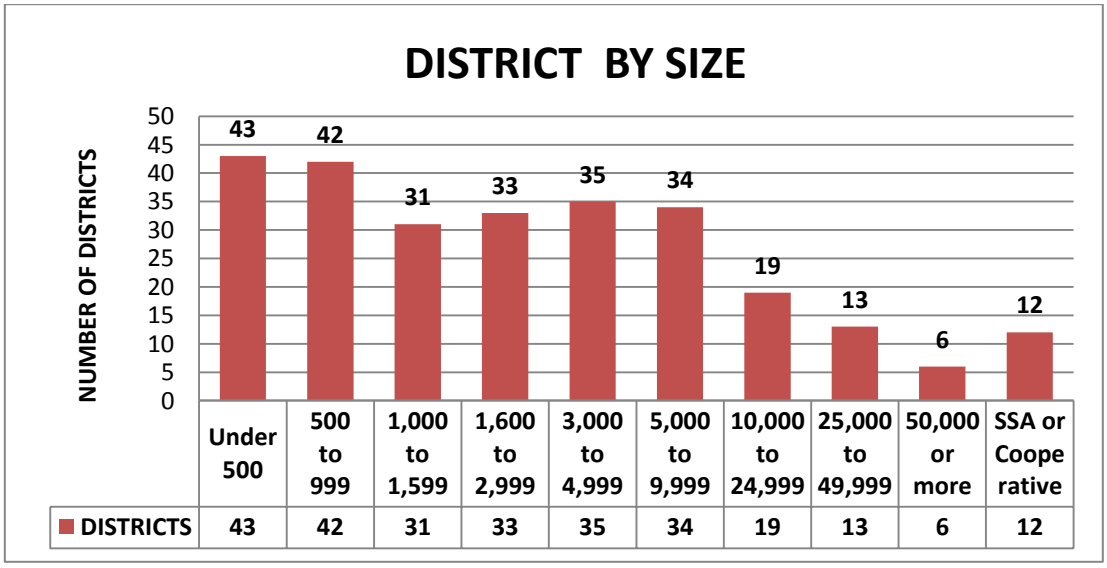

Figure 7. Distribution of district size based on TEA size categories (n = 268).

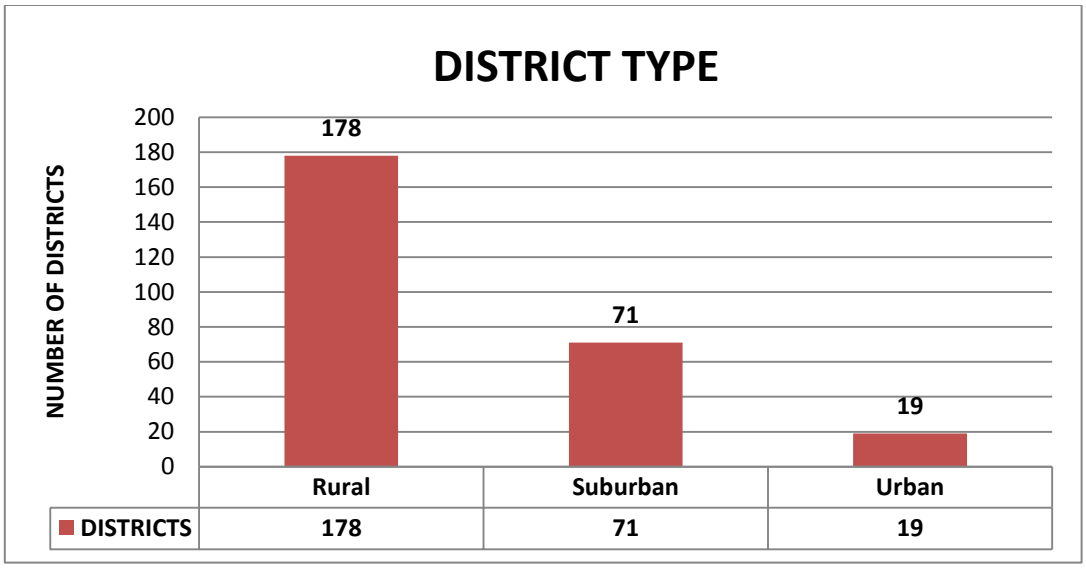

Figure 8. Distribution of district type within the sample (*n* = 268).

Representativeness of the sample. In general, research is conducted to explore, describe, predict, or explain some behavior or phenomenon within a population. Most researchers use samples of the population of interest because conducting research on an entire population is usually not feasible. But even for survey research that includes the entire population, response rates are often low and concerns arise about how well the sample actually represents the entire population. Estimating how well the sample represents the entire population is essential; otherwise, interpretation of the research findings will only provide information about the sample.

When including the entire population in the sample one might think that representativeness is of no concern; however, nonresponse rates can impact representativeness (Sax et al., 2003). Increasing response rates are thought to increase the representativeness of responses and decrease bias in survey research but, low response rates alone do not mean that nonresponse bias exists (Cook, Heath, &

Thompson, 2000; Fricker, 2008; Sax et al., 2003; Selm & Jankowski, 2006). To identify nonresponse bias, one begins with determining the rate of response.

Calculating the rate of response can be difficult in survey research because the nonresponders (e.g., some persons may not have received the invitation to participate) are often unknown (Selm & Jankowski, 2006). However, this study employed a non-probability purposive sampling approach that included the entire population of interest and email addresses were thought to be correct. Because the entire population was included, determining the response rate is not as difficult. Determining if the distribution of the responders is characteristic of the population is especially important when members of the population have the ability to "opt-in" or "opt-out" to participating in the research (Fricker, 2008).

Although response rates to surveys in general have steadily declined over the last 60 years (Cook, Heath, & Thompson, 2000; Krosnick, 1999) strategies such as personalized contacts and reminder contacts were employed to increase response rates. For the present study, 2192 central office administrators in Texas were identified as either a superintendent or director through the Texas Education Agency's AskTED website. The purposive sampling restricted the participants to several characteristics specifically related to the outcomes of the study. Each respondent was required to be a school district administrator who managed a federal budget. Any respondents not meeting those requirements were removed from the study. There were 305 responses to the survey; however, only 268 responses could be used due to missing data. This resulted in a response rate of approximately 12%. This low response rate made the sample representativeness critical.

To estimate the representativeness of the sample in the present study, a population profile was created to identify indicators of the population that could be used for comparison. The Kolmogorov-Smirnov (K-S) two independent samples test was chosen to analyze the indicators for the sample and the population. The K-S test analyzes the data to determine if two data sets differ significantly and produces a *D* test statistic that represents the "greatest vertical distance at any point between the two independent samples" (Sheskin, 2004). To apply the Kolmogorov-Smirnov test, the cumulative frequency is calculated for the sample and the population. The greatest discrepancy between the sample and the population is calculated and results as the *D* test statistic. The *D* test statistic is compared to the critical value, which can be calculated or found in a table of critical values for the K-S test. If the *D* test statistic is greater than the critical value, then reject the null hypothesis that the distributions are similar. However, if the critical value is larger than the *D* test statistic we would not obtain statistical significance and would fail to reject the null hypothesis that the sample and the population likely came from the same distribution. Therefore, in the present study, obtaining a statistically significant result would mean the distributions of the sample and the population were not similar. For purposes of representativeness, a *not statistically significant* result is favorable. In the present study, indicators identified for the sample and population comparison were: (a) gender, (b) position type, (c) district size, and (d) geographical location.

Distribution by gender. Distribution of gender was calculated for both the population and the sample. Based on the AskTED directory, the population consisted of 2192 central office administrators who matched the criteria for this study. Of those

administrators approximately 48% were male and approximately 52% were females. The data were further examined to determine the distribution of gender based on the employment position each administrator held. The results indicated that 36% of the population were male superintendents and 10% of the population were female superintendents. Also, within the population the gender distribution of mid-level central office administrators, such as directors or coordinators approximately12% were males and 42% were females. Differences in the population and the sample concerning gender ranged from 1% to 8% with a mean difference of 4.6%. Table 1 shows the comparisons of the distribution of gender for both the population and the sample, as well as the differences.

Table 1. *Distribution of gender within the population and the sample* .

Gender	Population $N = 2192$	Sample $n = 268$	Difference
Total Male	48%	40%	8%
Total Female	52%	60%	8%
Male Superintendents	36%	34%	2%
Female Superintendents	10%	16%	6%
Male Directors/Coordinators	12%	9%	3%
Female Directors/Coordinators	42%	41%	1%

The K-S test for two independent samples was also employed to examine the distributions of the sample and the population. Results of the K-S test are provided in Table 2. To interpret the results of the K-S test, the *D* test statistic is compared to the calculated critical values to determine if the differences between the population and sample differ to a statistically significant degree. Based on the K-S test results

comparing the distributions of the sample and the population, the *D* test statistic is less than the critical value (0.0831) at the .05 level, indicating that the distributions are likely similar. Thus, the differences between the population and the sample with respect to gender were not statistically significant. Figure 9 provides an illustration of the K-S test comparison of the sample and the population based on gender in each administrative position.

Table 2. *Kolmogorov-Smirnov Two Independent Samples Test for gender by position.*

Gender/Position	Population $N = 2192$	Sample $n = 268$	Population Percent	Sample Percent	*D*	0.05	0.01
Male Superintendents	789	91	0.3599	0.3396	0.0204	0.0831	0.0996
Female Superintendents	219	43	0.0999	0.1604	-0.0605		
Male Directors/Coordinators	263	24	0.1200	0.0896	0.0304		
Female Directors/Coordinators	921	110	0.4102	0.4104	0.0097		

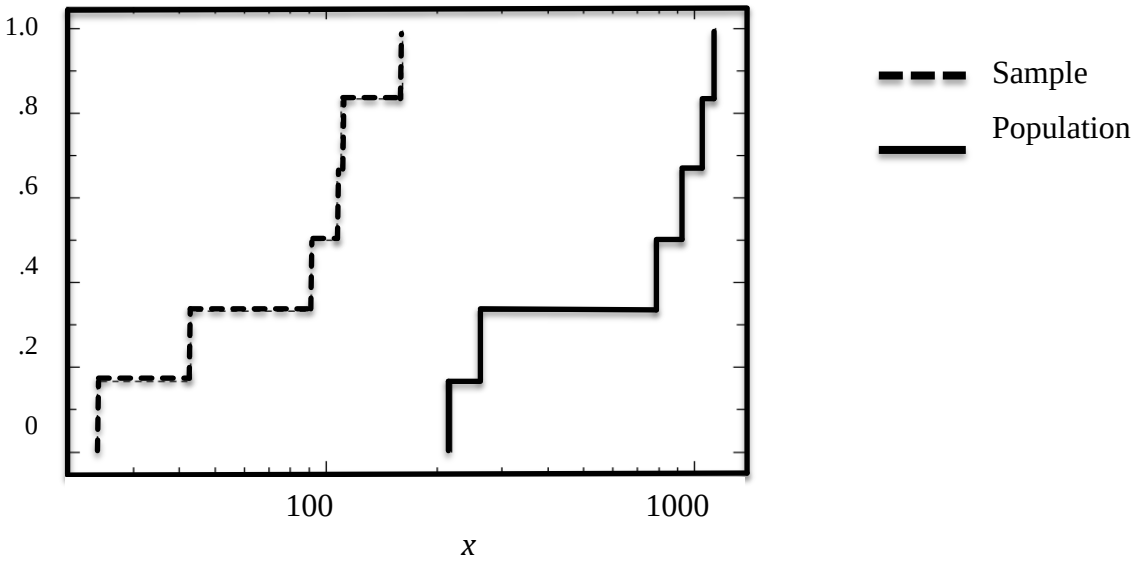

Figure 9. Kolmogorov-Smirnov Two Independent Samples Test for the sample and the population regarding gender by position.

Distribution of the position type. The survey was sent to superintendents and directors of special education and state and federal programs. To determine how well the sample represented the population concerning which central-office administrators responded to the survey, the percentage of superintendents and directors in the population was compared to the percent of superintendents and directors in the sample. Table 3 provides the distribution of responders based on their position.

Table 3. *Distribution of position type within the population and the sample.*

Position type	Population $N = 2192$	Sample $n = 268$	Difference
Superintendents	46%	50%	4%
Mid-Level Administrators (directors/coordinators)	54%	50%	6%

In addition to examining the percentages in the sample and the population concerning the number of superintendents and mid-level administrators who responded to the survey, the K-S test for two independent samples was conducted to compare the sample and the population regarding position type. Table 4 provides the results of the K-S test for position type. The *D* test statistic for both superintendents (*D* = -0.0401) and mid-level administrators (*D* = 0.0401) were less than the critical values at the .05 and .01 levels, indicating that the distributions of the sample and population for position type appear to be similar. Therefore, with respect to position type differences between the population and the sample were not statistically significant.

Table 4. *Kolmogorov-Smirnov Two Independent Samples Test for position type.*

Position type	Population *N* = 2192	Sample *n* = 268	Population Percent	Sample Percent	*D*	0.05	0.01
Superintendents	1008	134	0.4599	0.5000	-0.0401	0.0831	0.0996
Mid-Level Administrators (directors/coordinators)	1184	134	0.5401	0.5000	0.0401		

Distribution by district size. The size of the district is another characteristic used to compare school districts when determining the representativeness of the sample. The structure of the central office and the responsibilities of the administrators can vary widely based on the size of the district. Often, central-office administrators in small districts will serve in several different capacities, whereas administrators in larger districts may have more focused duties with much more volume. The TEA has divided

school districts into categories based on size. Each district is identified in one of nine (9) categories based on the number of students in the district. In addition to the nine size categories, for this study it was also important to recognize the Special Education Cooperatives and/or Shared Services Arrangements (SSA) because in a cooperative or SSA there are usually several small districts which share services as well as a special education director.

Based on data obtained from the TEA, 29% of all school districts fit into the less-than 500 students category. The subsequent category of 500 to 999 students is representative of approximately 16% of the districts in Texas. The population also consisted of 11% of districts in the 1,000 to1,599 category, 10.5% in the 1,600 to 2,999 category, 8% in the 3,000 to 4,999 category, 6% of the districts were in the 5,000 to 9,999 category, 5% in the 10,000 to 24,999 category, 3% of the districts in the 25,000 to 49,999 category with only 1.5% of the districts in the more than 50,000 students category. Additionally 10% of the special education programs in Texas have their special education services managed by a director who serves them in clusters or groups of small districts through a SSA or co-operative.

Data concerning district size were reported by the respondents when they completed the survey. Those responses were disaggregated into the size categories and compared to the population to determine if the sample was representative concerning district size. In the sample, 16% of the respondents work for districts that have fewer than 500 students, 14% in the 500 and 999 category, 11% of the districts fit into the 1,000 to 1,599 category, 13% in the 1,600 to 2,999 category,

14% were in the 3,000 to 4,999 category, 13% in the 5,000 to 9,999 category, 7% in the 10,000 to 24,999 category, and 2% of the respondents fit the more than 50,000 category. Additionally, 5% of the respondents reported their district was part of a cooperative or SSA. Table 5 provides the percentages of districts in each of the size categories for both the sample and the population.

Table 5. *Distribution of district size within the population and the sample.*

District Size Categories	Population $N = 1040$	Sample $n = 268$	Difference
Under 500	29%	16%	13%
500 – 999	16%	14%	2%
1,000 – 1,599	11%	11%	0%
1,600 – 2,999	10.5%	13%	1.5%
3,000 – 4,999	8%	14%	6%
5,000 – 9,999	6%	13%	7%
10,000 – 24,999	5%	7%	2%
25,000 – 49,999	3%	5%	2%
50,000 or more	1.5%	2%	.5%
SSA or Cooperative	10%	5%	5%

The data were also analyzed using the K-S test for two independent samples. Table 6 provides the results of the K-S test for the comparison of district sizes of the sample and the population and Figure 10 illustrates the two distributions. Results of the K-S test indicate that differences between the sample and the population for the district size category, *Under 500*, were statistically significant, indicating that the population and sample appear to be different in this size category. For all of the other size categories, the *D* test statistics were less than the critical values at both the .05 and .01 level. Therefore, the sample and population differences for districts with under 500

students were statistically significant. However, differences between the population and the sample with respect to district size in all other categories were not statistically significant.

Table 6. *Kolmogorov-Smirnov Two Independent Samples Test for district size.*

District Size	Population *N* = 1040	Sample *n = 268*	Population Percent	Sample Percent	D	0.05	0.01
Under 500	302	43	0.2904	0.1604	***0.1299***	0.0831	0.0996
500 – 999	166	38	0.1596	0.1418	0.0178		
1,000 – 1,599	114	29	0.1096	0.1082	0.0014		
1,600 – 2,999	109	35	0.1048	0.1306	-0.0258		
3,000 – 4,999	84	38	0.0808	0.1418	-0.0610		
5,000 – 9,999	63	35	0.0606	0.1306	-0.0700		
10,000 – 24,999	52	19	0.0500	0.0709	-0.0209		
25,000 – 49,999	32	13	0.0308	0.0485	-0.0177		
50,000 or more	16	5	0.0154	0.0187	-0.0033		
SSA	104	13	0.1000	0.0485	0.0515		

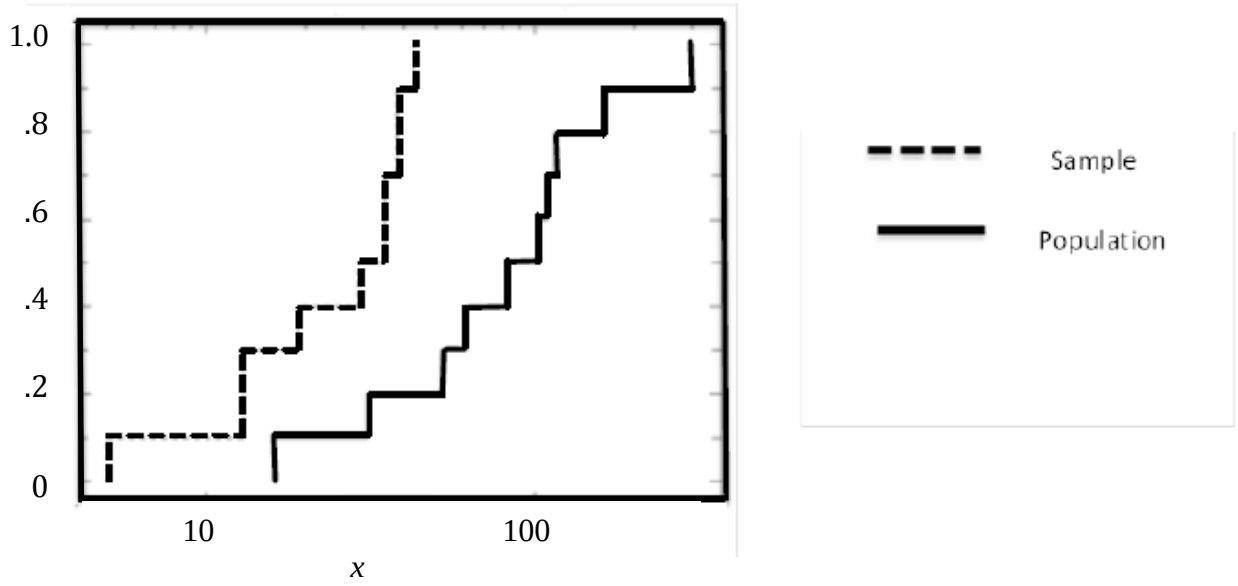

Figure 10. Kolmogorov-Smirnov Two Independent Samples Test for district size.

District distribution by geographical location. Another aspect of the population concerns the location of the district across the state. Texas is a large state which is divided into 20 "regions" with an Educational Service Center that provides support to the districts within their region. The percentage of districts in each region was calculated for both the population and the sample to determine the how well the sample may have represented each region in comparison to the population. In this study, all 20 regions were represented in the sample. Table 7 illustrates the distribution of districts by geographical location based on the educational regions within Texas. There was less than a 5% difference between the population and the sample in each of the 20 geographical locations in Texas, indicating the sample may have been representative of the population with regard to geographical location.

The differences between the population profile and the sample profile were minimal. The mean difference in central office administrator gender was 8%. However, further examination of gender differences indicated a 4% gender difference in superintendents and a 2% gender difference in mid-level administrators such as directors/coordinators. The difference in position type was 4% for superintendents and 6% for directors for a mean difference of 5%. District size and location were very similar for the population and sample. The mean difference in size was 3.9% and the mean difference in district geographical location was 2.9%. Table 6 provides the percentages and the differences between the sample and the population for each of the district size categories.

Table 7. *Distribution of districts based on geographical location.*

Region	Population N = 1,040	Sample n =260	Difference
1	3.63%	3.46%	0.17%
2	4.61%	1.92%	2.69%
3	3.93%	3.85%	0.08%
4	5.00%	9.23%	4.25%
5	3.15%	3.07%	0.08%
6	5.59%	6.15%	0.56%
7	9.03%	7.69%	1.34%
8	4.61%	3.85%	0.76%
9	4.02%	3.46%	0.56%
10	7.95%	9.62%	1.67%
11	7.56%	4.62%	2.94%
12	7.75%	8.08%	2.70%
13	5.89%	9.23%	3.34%
14	4.12%	3.85%	0.27%
15	4.32%	2.31%	2.01%
16	5.30%	4.23%	1.07%
17	5.69%	3.46%	2.23%
18	3.53%	5.00%	1.47%
19	1.18%	1.54%	0.36%
20	3.14%	5.38%	2.24%

The K-S test was used to analyze the data from the sample and population based on the geographical location of the districts. After the analysis, the data for the sample and the population concerning the 20 Educational Service Center Regions indicated that the sample and the population were similar. The *D* test statistic was less than the critical value at both the .05 and the .01 level for all 20 regions. Table 8 provides the results of the K-S test and Figure 11 illustrates the cumulative frequencies for both the sample and

the population. Thus, the differences between the population and the sample with respect to geographical region were not statistically significant.

Table 8. *Kolmogorov-Smirnov Two Independent Samples Tests for geographical Location.*

Region	Population $N = 1040$	Sample $n = 268$	Population Percent	Sample Percent	D	0.05	0.01
1	38	9	0.0365	0.0336	0.0030	0.0831	0.0996
2	48	5	0.0461	0.0187	0.0275		
3	41	10	0.0394	0.0373	0.0021		
4	52	25	0.0500	0.0933	-0.0433		
5	33	8	0.0317	0.0299	0.0019		
6	58	16	0.0558	0.0597	-0.0039		
7	94	21	0.0904	0.0784	0.0120		
8	48	10	0.0462	0.0373	0.0088		
9	42	9	0.0404	0.0339	0.0068		
10	83	26	0.0798	0.0970	-0.0172		
11	79	12	0.0760	0.0448	0.0312		
12	81	22	0.0779	0.0820	-0.0042		
13	61	25	0.0587	0.0933	-0.0346		
14	43	10	0.0413	0.0373	0.0040		
15	45	6	0.0433	0.0224	0.0209		
16	55	11	0.0529	0.0410	0.0118		
17	59	9	0.0567	0.0336	0.0231		
18	37	13	0.0356	0.0485	-0.0129		
19	12	4	0.0115	0.0149	-0.0034		
20	33	14	0.0317	0.0522	-0.0205		

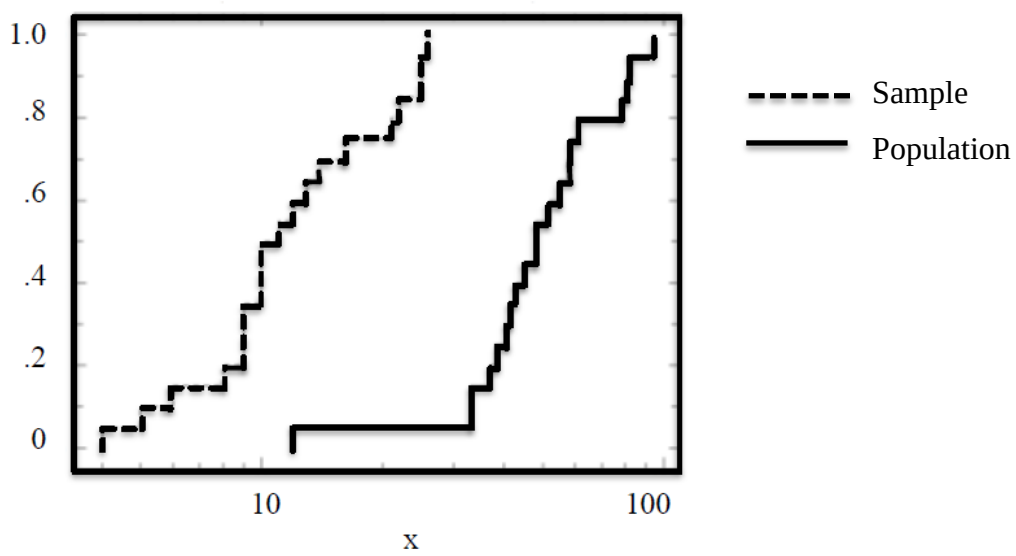

Figure 11. Kolmogorov-Smirnov Two Independent Samples Test for the cumulative results comparing the sample and population for district geographical location.

Descriptive Statistics

Descriptive statistics examine measures of independent and dependent variable sets to provide a more detailed description of each set. As recommended by Wilkinson and the Task Force on Statistical Inference (1999), this study provides both tables and figures whenever possible to assist readers in better understanding the data. In the present study, descriptive statistics were calculated for both the dependent and independent variables. Tables 9 through 14 provide the descriptive data collected in a table format to provide a contextual basis for the study.

Table 9. *Sample descriptive statistics for current employment position (n = 268).*

Employment	Frequency	Percent	Cumulative Percent
Campus Administrator	5	01.9	01.9
State and Federal Program Director	53	19.8	21.6
Special Education Director	71	26.5	48.1
Assistant Superintendent	45	16.8	64.9
Superintendent	73	27.2	92.2
Other	27	07.8	100
Total	268	100	

Table 10. *Sample descriptive statistics for years of experience in current position (n = 268).*

Experience	Frequency	Percent	Cumulative Percent
Less than 1 year	36	134	13.4
1-3 years	79	29.5	42.9
4-6 years	61	22.8	65.7
7-9 years	45	16.8	82.5
10+ years	47	17.5	100
Total	268	100	

Table 11. *Sample descriptive statistics for total years of administrative experience (n = 268).*

Total Experience	Frequency	Percent	Cumulative Percent
Less than 1 year	7	02.6	02.6
1-3 years	8	03.0	05.6
4-6 years	27	10.1	15.7
7-9 years	42	16.0	31.7
10+ years	183	68.3	100
Total	268	100	

Table 12. *Descriptive statistics for highest degree held by administrator (n = 268).*

Degree	Frequency	Percent	Cumulative Percent
Bachelor	7	02.6	02.6
Master	197	73.5	76.1
Ed.D.	52	19.4	95.5
Ph.D.	12	4.5	100
Total	268	100	

Table 13. *Descriptive statistics for the seventeen variables in the factors Knowledge, Beliefs, and Perceptions of Evidence-Based Decision-Making Practices (n = 268).*

Variable	*Mean*	*SD*	Min	Max	*n*
ACHIEVEM 6. research is important for improving achievement	5.28	.851	1	6	268
FIND_RES 2. know how to locate research	5.14	.941	1	6	268
LIT_OP 5. Literature and research are important	5.11	.905	1	6	268
FORM_QUE 1. formulate a clear question from school data	5.10	.859	1	6	268
RES_SHAR 9. I share research evidence	4.88	.967	1	6	268
STUD_ACH 12. Research evidence is important	4.83	.979	2	6	268
CAPABLE 8. capable of evaluating the quality of research	4.81	.920	2	6	268
EVALU_RE 14. evaluate research to guide my decisions	4.64	.878	1	6	268
TRACKRES 4. I track down research	4.58	1.02	1	6	268
CRITICAL 17. I critically examine the research	4.55	1.06	1	6	268
DIFFEREN 13. reading to differentiate strong from weak	4.54	.909	1	6	268
DESIGN_Q 16. design fits the research question	4.35	1.07	1	6	268
EFFECTIV 15. identify an effective program	4.32	.961	1	6	268
SKEPTICLR 11. skeptical of research	3.75	1.25	1	6	268
DETERMIN10. Determine a useful a program by reading research	3.68	1.12	1	6	268
READTIMER 3. Do not have time to read the research	3.53	1.35	1	6	268
WRIT_CLRR 7. Research written clearer	2.25	1.16	1	6	268

Note. The items are ordered by means.

Table 14. *Descriptive statistics for the factor Self-Confidence in Statistics (n = 260).*

Variable	*Mean*	*SD*	Min	Max	*n*
CENT_TEN 14. When mean, median, and mode as central tendency.	4.60	1.24	1	6	260
EVIDEN_Q 7.Differentiate between strong and weak evidence	4.54	1.00	1	6	260
SAMP_DIS 15. Difference sampling and pop distribution	4.44	1.25	1	6	260
STAN_DEV 5. Explain the value of the standard deviation	4.36	1.28	1	6	260
MEAS_SCL 1. Identify the scale of measurement for a variable	4.28	1.11	1	6	260
METHODOL 12. Determine appropriateness of methodology used.	4.27	1.21	1	6	260
STAN_ERR 8. Numeric value of what the standard error	4.27	1.24	1	6	260
UNDERSTA 16. Overall confidence in understanding	4.25	1.12	1	6	260
ST_POWER 4. Identify the factors that influence power	4.17	1.15	1	6	260
STAT_PRO 6.Interpret the results of a statistical procedure	4.11	1.24	1	6	260
INFERENT 13. Distinguish descriptive versus inferential	3.97	1.33	1	6	260
P_VALUE 2. Interpret (*p* value) from a statistical procedure	3.97	1.19	1	6	260
SKEWNESS 3.Identify skewed distribution based on central tendency	3.97	1.22	1	6	260
PARAM_ST 11. Difference between a parameter and a statistic.	3.88	1.36	1	6	260
CONF_INT 10. Interpret confidence intervals.	3.87	1.40	1	6	260
TYPE_ERR 9. Distinguish a Type I error from Type II error	3.29	1.36	1	6	260

Note. Statistics self-confidence adapted (addition of questions 7 and 16) from the statistics self-confidence (SSC) survey. permission obtained through the Elsevier copyright clearance center.

Exploratory Factor Analysis

When conducting survey research, exploratory factor analysis can be used to identify latent variables, or factors, that might be represented by a set of items or questions. Exploratory factor analysis is a theory-generating procedure (Stevens, 2002) and a variable reduction procedure in which multiple variables are reduced to a few factors, creating constructs, or latent variables that summarize the relationship between variables in a set (Goldberg & Digman, 1994). Thompson (2004) explained exploratory factor analysis as a procedure to "inform evaluations of score validity," "to develop

theory regarding the nature of constructs," or to "summarize relationships in the form of a more parsimonious set of factor scores that can then be used in subsequent analyses" (pp. 4–5).

All administrator practices. An exploratory factor analysis using SPSS statistical software was conducted to analyze the data and investigate the underlying constructs in the data collected in this study. Principal component analysis with a promax rotation was used to investigate the underlying constructs of the 15 items for administrators' perceptions of their evidence-based decision-making practices. Promax rotation is an oblique rotation method that is used when the factors are correlated (Gorsuch, 1983). When using the statistical software SPSS the results of the promax rotation are reported as both a pattern coefficient matrix and a structure coefficient matrix. The elements in the pattern coefficient matrix are analogous to standardized regression coefficients that indicate the importance of each item to the factor, while controlling for the impact of other variables (Stevens, 2002). The structure coefficient matrix consists of the correlations of the factors and variables (Fabrigar & Vegener, 2010).

The eigenvalues produced by the principal components analysis were used to determine the number of factors to extract. Eigenvalues indicate the amount of variation in the items that can be accounted for by each factor. The scree plot is a graph that provides a visual with the number of factors on the x-axis and eigenvalues on the y-axis. The scree plot provides a picture of the eigenvalues, allowing the researcher to see the components with the most variance as well as those with very little variance. The scree test allows the researcher to identify the factors to be extracted by identifying the points

on the chart that come before the data levels off. Another widely used method for determining the number of factors to extract is the eigenvalue greater than one rule (Stevens, 2002). This rule uses the eigenvalues computed for each variable and identifies the factors to be extracted based on the eigenvalues that are greater than one.

The scree test and the K-1 rule were used to determine the number of factors to extract for the items for All Administrator Practices. With all 17 items, simple structure was poorly obtained. The scree plot suggested possibly three factors, and there were four eigenvalues greater than one. The item with the lowest communality was removed, but the pattern coefficients indicated one factor would then contain only two items. The missing value analysis in SPSS indicated that there were outliers on the low and high extremes for item 10 (DETER- "determine a useful a program by reading research"). Having outliers on both extremes is not unusual within data, but no other variables in this sample exhibited this dynamic within the responses. Therefore, the item was removed and the factor analysis was performed again. With the 16 items, three eigenvalues were greater than one and the pattern coefficient was small for the item asking about the importance of literature and research. The number of extreme low values (i.e., outliers) on that item was tied with another variable. Therefore, this item was also deleted and then the three factors emerged with each factor containing at least three items.

The eigenvalues for the factor analysis results with 15 items was included in Table 11. An examination of the scree plot indicated that the eigenvalues tapered off at the second factor with very little difference between the third and fourth factors (see Figure 12). The identification of the factors was supported by an examination of the

explained variance of the eigenvalues in Table 15 and applying the K-1 Rule. Further examination of the variables in the pattern coefficient and structure coefficient matrices supported the identification of the three factors and aligned the items within each of the factors.

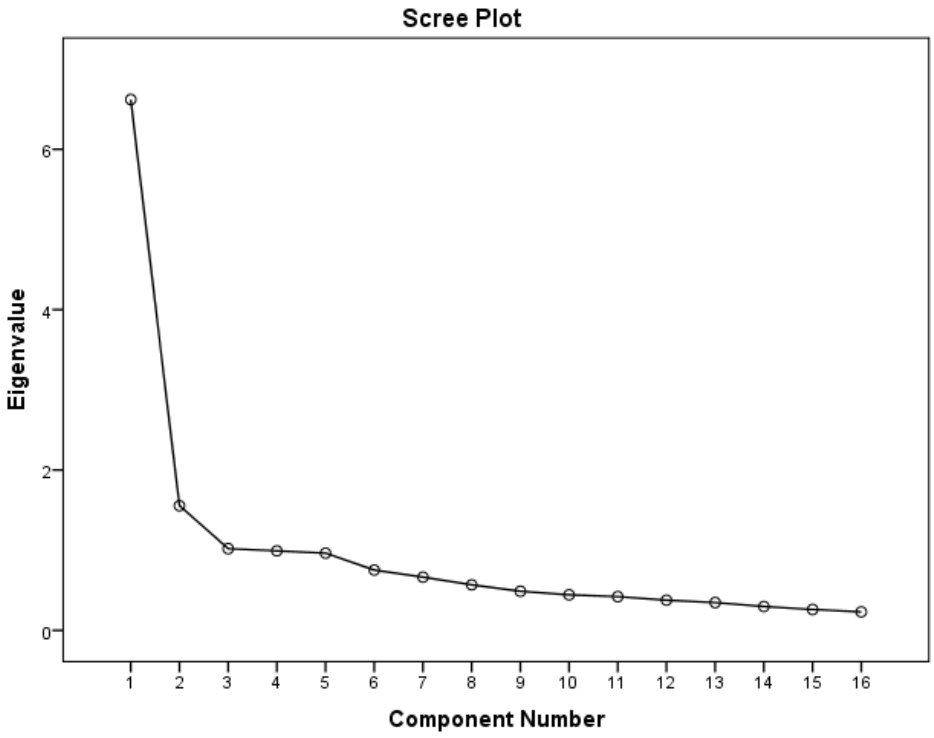

Figure 12. Scree plot for *All Administrator Practices* (*n* = 268).

Table 15. *Explained variance for the 15 eigenvalues for All Administrator Practices (n = 268).*

Eigenvalue	Total Explained Variance	Percent of Variance	Cumulative Percent of Variance
1	***6.053***	40.358	40.356
2	***1.550***	10.333	50.689
3	***1.017***	6.780	57.469
4	.988	6.590	64.059
5	.852	5.682	69.741
6	.752	5.012	74.753
7	.658	4.389	79.142
8	.544	3.627	82.769
9	.480	3.199	85.968
10	.439	2.929	88.897
11	.421	2.807	91.704
12	.360	2.399	94.103
13	.340	2.268	96.371
14	.293	1.955	98.326
15	.251	1.674	100.00

Note. Eigenvalues greater than 1 are red, bolded, and italicized.

Sample pattern coefficients. The pattern coefficients further defined the factors by aligning the items within each factor, indicating the importance of each item to the factor. The pattern coefficient matrix supports the identification of three factors or latent variables within items for All Administrator Practices. Table 16 provides the sample pattern coefficient matrix which represents the linear combination of the variables and allows the researcher to further define the factors. In this study the factors were defined as: a) *Knowledge*, b) *Beliefs*, and c) *Perceptions of Practices*. Nine items linked to the

factor *Knowledge*, three items linked to the factor *Beliefs*, and three items linked to the factor *Perceptions of Practices*.

Table 16. *Pattern coefficient matrix displaying the alignment of the variables within each factor (n = 268).*

Variables	Factors		
	I	II	III
DESIGN_Q 16. design fits the research question	***.897***	-.220	.090
STUD_ACH 12. Research evidence is important	***.849***	-.124	-.076
CRITICAL 17. I critically examine the research	***.755***	.088	.034
EVALU_RE 14. evaluate research to guide my decisions	***.731***	.065	-.191
DIFFEREN 13. reading to differentiate strong from weak	***.721***	.150	.005
ACHIEVEM 6. research is important for improving achievement	***.632***	.038	-.113
EFFECTIV 15. identify an effective program	***.600***	.186	.143
RES_SHAR 9. I share research evidence	***.587***	.071	-.209
CAPABLE 8. capable of evaluating the quality of research	***.466***	.278	.178
FORM_QUE 1. formulate a clear question from school data	-.099	***.906***	-.086
FIND_RES 2. know how to locate research	.050	***.829***	.033
TRACKRES 4. I track down research	.332	***.470***	-.037
WRIT_CLRR 7 Research written clearer	-.357	.124	***.769***
SKEPTICLR 11 skeptical of research	.134	-.180	***.723***
READTIMER 3 Do not have time to read the research	.209	-.070	***.533***

Note. Pattern coefficients greater than .465 are red, bolded, and italicized.

Sample structure coefficients. The factor structure matrix represents the correlations between the variables and the factors and is often called the factor loading matrix (Fabrigar & Vegener, 2010). Again, the structure coefficients identified three factors as illustrated in Table 17, which were defined for the present study as: a) *Knowledge*, b) *Beliefs*, and c) *Perceptions of Practices*. As with the pattern coefficients, the structure coefficients also linked nine items to the factor *Knowledge*, three items linked to the factor *Beliefs*, and three items linked to the factor *Perceptions of Practices*.

Table 17. *Structure coefficient matrix displaying the alignment of the variables within each factor (n = 268).*

Variables	Factors		
	I	II	III
CRITICAL 17. I critically examine the research	***.811***	.532	.153
EVALU_RE 14. I evaluate research to guide my decisions	***.808***	.571	.115
DESIGN_Q 16. design fits the research question	***.787***	.379	.188
STUD_ACH 12. Research evidence is important	***.755***	.295	.020
ACHIEVEM 6. research is important for improving achievement	***.741***	.474	-.077
DIFFEREN 13. reading to differentiate strong from weak	***.729***	.550	.248
EFFECTIV 15. identify an effective program	***.659***	.434	.302
CAPABLE 8. capable of evaluating the quality of research	***.654***	.568	.273
RES_SHAR 9. I share research evidence	***.637***	.396	-.017
FIND_RES 2. know how to locate research	.529	***.854***	.054
FORM_QUE 1. formulate a clear question from school data	.418	***.840***	-.014
TRACKRES 4. I track down research	.601	***.661***	.057
WRIT_CLRR 7 Research written clearer	-.172	-.011	***.728***
SKEPTICLR 11 skeptical of research	.134	-.032	***.725***
READTIMER 3 Do not have time to read the research	.246	.104	***.557***

Note. Structure coefficients greater than .555 are red, bolded, and italicized.

Bootstrap Factor Analysis

The replicabilty of findings is at the core of every research project and, therefore, measures should be taken to ensure that results can be duplicated. However, people are individually different and replicating results in social science research can be challenging. To ensure replicability, researchers must employ either external or internal methods (Thompson, 1993, 1996; Zientek & Thompson, 2007). Researchers could obtain another sample and replicate their own study, but that could be time consuming and expensive. Instead, there are statistical methods such as the bootstrap method that empirically estimates replicability by applying the bootstrap method to the existing sample data (Zientek & Thompson, 2007). The bootstrap method resamples the data

numerous times by mixing up the existing data in different ways to determine if the results are stable across multiple combinations of study participants (Thompson, 1999; Zientek & Thompson, 2007). In this study, the bootstrap method was used and sampled the existing data 1000 times to examine the replicability of the results and to aid in determining the number of factors to retain.

Bootstrap eigenvalues. The bootstrap method is unique in that it can be applied to many parameters of interest (Zientek & Thompson, 2007). Because a promax rotation was conducted, the bootstrap results were not conducted for the pattern/structure coefficients; however, eigenvalues are a critical part of the determination of the number factors to extract and therefore the bootstrap method was applied to confirm that the items were linked to the three factors identified in the exploratory factor analysis. Plots of the empirically estimated sampling distributions for the eigenvalues are presented in Figure 13. The mean and empirically estimated standard deviation of the repeated samples (i.e., empirical standard error) were computed for each factor and illustrated in Table 18. In each of the 1000 resamples the same sample size of 268 was drawn. The parameter estimates empirically estimated the standard deviation and the t statistic. The bootstrapped eigenvalues were then compared to the eigenvalues in the original data analysis with the hope that the two would be relatively close. Based on the empirically estimated eigenvalue means and standard deviations, the first two factors are easily identified as factors to extract. For the third eigenvalue, the 1000 bootstrapped results ranged from .90 to 1.39. Although, the third eigenvalue looked questionable the bootstrapped estimated mean is slightly higher than the initial eigenvalue and was greater than one. Therefore, the decision was made to keep the third factor.

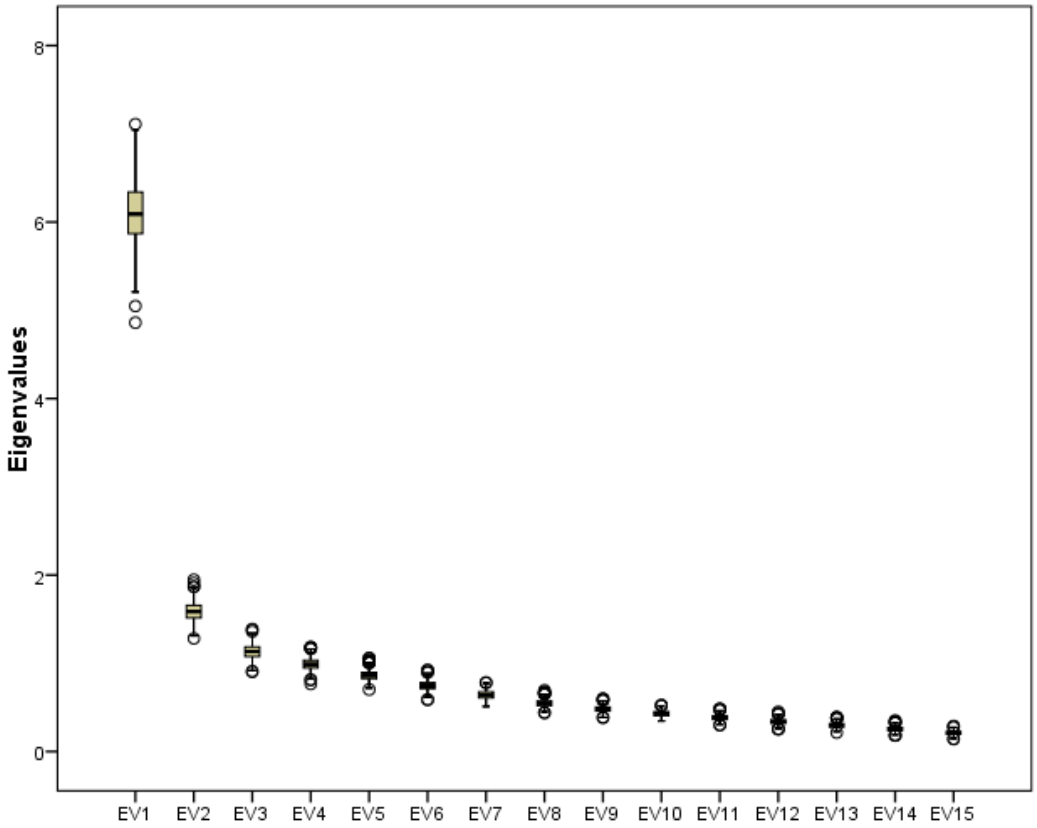

Figure 13. Empirically estimated sampling distribution of the 15 eigenvalues for *All Administrators' Practices*.

Table 18. *Comparison of eigenvalues from sample and bootstrap results across 1000 resamples.*

Sample	Eigenvalue	Mean Bootstrap Results	*SD*	*t* statistic
1	***6.053***	***6.10***	0.34	17.84
2	***1.550***	***1.59***	0.10	15.76
3	***1.017***	***1.13***	0.08	14.17
4	.988	0.99	0.06	15.53
5	.852	0.86	0.06	15.40
6	.752	0.75	0.05	14.56
7	.658	0.64	0.05	13.40
8	.544	0.55	0.04	14.03
9	.480	0.48	0.03	14.02
10	.439	0.43	0.03	13.53
11	.421	0.38	0.03	12.63
12	.360	0.34	0.03	11.25
13	.340	0.30	0.03	10.82
14	.293	0.26	0.02	10.39
15	.251	0.21	0.02	09.02

Note. SD = standard deviation. Eigenvalues larger than 1 are red, bolded, and italicized.

Exploratory factor analysis for self-confidence in statistics. In the statistics' self-confidence section of the survey, there were 16 questions designed to measure the respondents' self-confidence on some of the basic statistics and analyses that are often reported in social science research. However, there were eight respondents who did not answer any of the statistics self-confidence questions. Because of this, the exploratory factor analysis of the self-confidence items was conducted with a sample size of 260 (n = 260). Principal component analysis with promax rotation was used to investigate the underlying constructs of the 16 items for *Self Confidence*. As previously noted, the promax rotation is an oblique rotation method that is used when the factors are correlated (Gorsuch, 1983). As seen in Figure 14, an examination of the scree plot

indicated that there was only one factor in the self-confidence data. Additionally, when the K-1 rule was applied, only one factor was identified, as seen in Table 19.

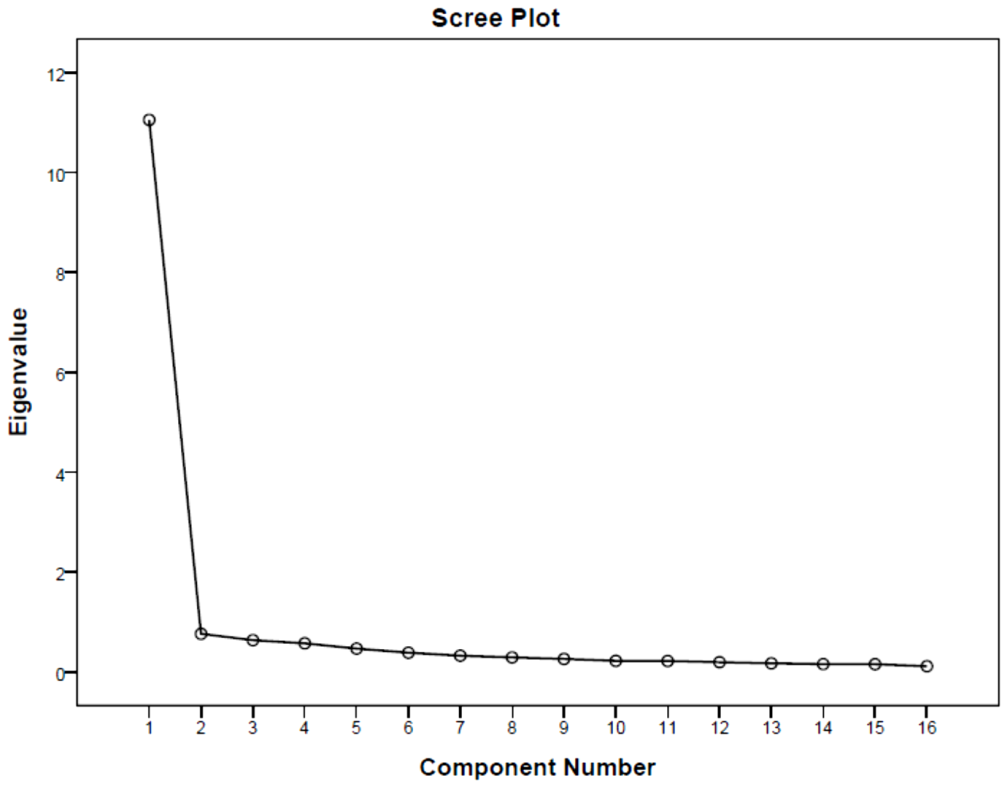

Figure 14. Scree plot of the *Statistics' Self-Confidence* data (*n* = 260).

Table 19. *Explained variance for the sixteen eigenvalues on self-confidence in statistics (n = 260).*

	Initial Eigenvalues		
Factor	Total	Percent of Variance	Cumulative Percent
1	***11.047***	69.047	69.3047
2	.764	4.773	73.820
3	.637	3.980	77.801
4	.574	3.588	81.389
5	.469	2.929	84.318
6	.386	2.414	86.732
7	.326	2.040	88.772
8	.292	1.827	90.599
9	.261	1.633	92.232
10	.223	1.393	93.625
11	.220	1.377	95.002
12	.196	1.225	96.227
13	.174	1.088	95.315
14	.158	.989	98.303
15	.156	.975	99.279
16	.115	.721	100

Note. Eigenvalues larger than 1 are red, bolded, and italicized

Score Reliability

Score reliability is important in any study. Score reliability estimates change when administered to different samples, and therefore, should never be referred to as "the reliability of the instrument" (Thompson, 2004; Nimon, Zientek, & Henson, 2012). Cronbach's alpha is the most widely reported method of estimating score reliability and measures the degree to which items measure the same construct (Thompson, 2003). The internal consistency for the survey scores suggested that all constructs were sufficient for further statistical analyses. Tables 20 through 24 provide the reliability diagnostics for each factor. The reliabilities were sufficient for all factors except *Beliefs*.

Table 20. *Reliability diagnostics for the factor Administrators' Perceptions (n = 268).*

	Item-Total Statistics	
Variables	Corrected Item-Total *r*	Cronbach's α if Item Deleted
P1	.520	.713
P2	.674	.529
P3	.526	.716

Note. α for the total scores on the 268 participants on the 3 items was.**743**.

Table 21. *Reliability diagnostics for the factor Beliefs (n = 268).*

	Item-Total Statistics	
Variables	Corrected Item-Total *r*	Cronbach's α if Item Deleted
B1	.239	.468
B2	.271	.403
B3	.369	.227

Note. α for the total scores on the 268 participants on the 3 variables was .**468**.

Table 22. *Reliability diagnostics for the factor Knowledge (n = 268).*

	Item-Total Statistics	
Variables	Corrected Item-Total *r*	Cronbach's α if Item Deleted
K1	.529	.893
K2	.741	.877
K3	.704	.879
K4	.742	.876
K5	.647	.884
K6	.626	.886
K7	.688	.881
K8	.597	.888
K9	.645	.884

Note. α for the total scores on the 268 participants on the 9 variables was .**895**.

Table 23. *Reliability diagnostics for All Administrator Practices (n = 268).*

Variables	Item-Total Statistics	
	Corrected Item-Total *r*	Cronbach's α if Item Deleted
P1	.453	.843
P2	.560	.837
P3	.571	.836
K1	.516	.839
K2	.718	.830
K3	.653	.831
K4	.719	.827
K5	.598	.836
K6	.621	.834
K7	.669	.832
K8	.590	.836
K9	.575	.836
B1	.255	.859
B2	-.035	.872
B3	.178	.862

Note. α for the total scores on the 268 participants on the 15 variables was .**850**.

Table 24. *Reliability diagnostics for Statistics Self-Confidence variables (n = 260).*

	Item-Total Statistics	
Variables	Corrected Item-Total *r*	Cronbach's α if Item Deleted
SC1	.759	.968
SC2	.842	.967
SC3	.845	.967
SC4	.740	.968
SC5	.806	.967
SC6	.854	.968
SC7	.776	.967
SC8	.828	.967
SC9	.756	.968
SC10	.826	.967
SC11	.814	.968
SC12	.818	.967
SC13	.801	.967
SC14	.750	.968
SC15	.785	.968
SC16	.871	.968

Note. α for the total scores on the 260 participants on the 16 variables was **.969**.

Variance/Covariance Matrices

Providing matrix summaries, means, and standard deviations enables researchers to conduct the same analysis or different analyses without the actual data set. The analyses that are part of the general linear model are hierarchical in nature (see Bagozzi, Fornell, & Larcker, 1981; Cohen, 1968; Knapp, 1978; Thompson, 2006a; Zientek & Thompson, 2009) and the first steps to each analyses is the creation of the correlation or variance/covariance matrices. Tables 25 and 26 contain the variance/covariance matrices for the variables in this study.

Table 25. *Variance/covariance matrix for the fifteen variables in administrator practices (n = 268).*

Var	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.0457														
2	0.4122	0.9341													
3	0.4961	0.3999	0.7711												
4	0.4917	0.4115	0.5619	1.1424											
5	0.5987	0.4948	0.6351	0.7344	1.1246										
6	0.3210	0.2706	0.2926	0.2254	0.3653	0.7381									
7	0.5351	0.2936	0.4073	0.3508	0.4195	0.4533	0.8862								
8	0.3892	0.3991	0.3775	0.4009	0.4499	0.2857	0.3652	0.7250							
9	0.2819	0.3258	0.3789	0.4990	0.4858	0.3162	0.3797	0.3459	0.8461						
10	0.3490	0.3395	0.4761	0.5711	0.5186	0.3182	0.3655	0.3380	0.4754	0.8263					
11	0.3309	0.2100	0.4176	0.4812	0.4867	0.2394	0.3471	0.3482	0.4490	0.4504	0.9242				
12	0.3475	0.3808	0.4470	0.5211	0.5408	0.2240	0.3241	0.5157	0.3411	0.3922	0.4454	0.9592			
13	0.2441	0.2422	0.2626	0.2940	0.2640	0.0373	0.1220	0.0833	0.2320	0.2196	0.1433	0.0776	1.8226		
14	-0.0659	-0.1653	-0.1176	-0.0481	-0.0920	-0.0903	-0.1073	-0.2201	0.0120	-0.0245	0.0334	-0.1211	0.2040	1.3661	
15	-0.0044	0.0617	0.0467	0.0779	0.1344	-0.0307	0.0383	0.0859	0.1101	0.1271	0.2176	0.1342	0.4267	0.4475	1.5627

Note. Var = Variables; 1 = TRACKRES 4; 2 = RES_SHAR 9; 3 = EVALU_RE 14; 4 = DESIGN_Q 16; 5 = CRITICAL 17; 6 = FORM_QUE 1; 7 = FIND_RES 2; 8 = ACHIEVEM 6; 9 = CAPABLE 8; 10 = DIFFEREN 13; 11 = EFFECTIV 15; 12 = STUD_ACH 12; 13 = READTIMER; 14 = WRIT_CLRR; 15 = SKEPTICLR

Table 26. *Variance/covariance matrix for the sixteen Statistics Self-Confidence items (n = 260).*

Var	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1.220															
2	0.994	1.424														
3	0.916	1.157	1.489													
4	0.795	0.948	0.978	1.315												
5	0.896	1.067	1.212	0.888	1.629											
6	0.919	1.139	1.142	0.989	1.187	1.528										
7	0.776	0.795	0.793	0.726	0.792	0.878	1.006									
8	0.870	1.029	1.055	0.803	1.237	1.120	0.863	1.535								
9	0.896	1.184	1.125	0.970	1.010	1.106	0.717	0.947	1.852							
10	1.005	1.192	1.282	0.941	1.264	1.258	0.886	1.376	1.305	1.967						
11	0.876	1.096	1.185	0.921	1.099	1.091	0.893	1.115	1.360	1.347	1.838					
12	0.843	0.990	0.943	0.927	0.955	1.112	0.863	1.056	1.016	1.125	1.126	1.466				
13	0.863	1.053	1.072	0.890	1.020	1.131	0.834	1.075	1.199	1.285	1.366	1.230	1.763			
14	0.715	0.843	0.972	0.706	1.054	1.010	0.702	1.041	0.933	1.047	1.078	.945	1.040	1.531		
15	0.778	0.923	0.983	0.856	1.053	1.009	0.788	1.069	0.983	1.135	1.135	1.007	1.085	1.193	1.560	
16	0.846	0.986	0.973	0.792	1.002	1.038	0.810	1.051	0.992	1.133	1.108	1.059	1.101	1.016	1.071	1.254

Note. Var = Variables; 1 = MEAS_SCL; 2 = P_VALUE; 3 = SKEWNESS; 4 = ST_POWER; 5 = STAN_DEV; 6 = STAT_PRO; 7 = EVIDEN_Q; 8 = STAN_ERR; 9 = TYPE_ERR; 10 = CONF_INT; 11 = PARAM_ST; 12 = METHODOL; 13 = INFERENT; 14 = CENT_TEN; 15 = SAMP_DIS; 16 = UNDERSTA.

Research Question I

To answer the research question regarding the extent to which administrators' (a) *Knowledge,* (b) *Beliefs,* and (c) *Self Confidence* concerning statistical methodology and analysis predict administrators' perceptions of their evidence-based practices, multiple regression and commonality analyses were conducted. Research in the social sciences often employs the interpretation of beta weights in multiple regression analysis to determine the independent variable contributions on the variation of the dependent variable. However, overreliance on the interpretation solely of beta weights can result in a limited view of variable importance (Courville & Thompson, 2001; Nimon, Gavrilova, & Roberts, 2010; Zientek, Capraro, & Capraro, 2008). Even though researchers begin their interpretation of multiple regression analysis with beta weights, researchers should also report a combination of statistics to allow readers a better understanding of how each variable contributes to the variation in the dependent variable. As such, in this study both regression beta weights and squared structure coefficients, as well as commonality analysis coefficients, are reported and interpreted to clearly present the contribution of each independent variable and further understand the dynamics within the data.

Multiple regression results. The multiple R for the independent variables and the dependent variable of *Perceptions of Practices* was .689 ($F [3, 264] = 79.569$, $p < .001$) and the R^2 was .475. Table 27 presents a summary of the regression results comparing the beta weights, squared structure coefficients (r_s^2), and both the unique and common commonality coefficients. Beta weights indicate the increase or decrease in the

dependent variable given a one standard deviation increase in the independent variable, holding all other independent variables constant (Nathans, Oswald, & Nimon, 2012). A key benefit of beta weights is that they provide an indication of variable importance; however, they do not parcel out the shared variance and could be taking credit for the variance that is also accounted for by other variables (Nathans et al., 2012). The beta weights for this study were; *Knowledge* .567, *Beliefs* ─.078, and *Self Confidence* .187. The beta weights were largest for *Knowledge* followed by *Self Confidence*. The near-zero beta weight for *Beliefs* could indicate that it does not contribute to the variance in administrators' perceptions of their evidence-based decision-making practices, or that the variance of this predictor was common to other predictors. However, subsequent analyses ruled out this second possibility in the present case.

Table 27. *Multiple regression analysis sources for predicting administrator's Perceptions of Practices (n = 268).*

Variables	Beta	r_s^2
Knowledge	0.567	97.23%
Self-Confidence	0.187	75.17%
Beliefs	─0.078	3.48%

Note. r_s^2= squared structure coefficient. The independent variables have been sorted by the squared structure coefficients.

Structure coefficients in combination with beta weights better inform researchers regarding the dynamics within the data. The squared structure coefficients represent the amount of variance that the independent variable shares with the predicted scores of the dependent variable (Courville & Thompson, 2001). The squared structure coefficients

reported in this study shown in Table 27 were as follows: 97.23% for *Knowledge*, 75.17% for *Statistics Self Confidence*, and 3.48% for *Beliefs*. A large squared structure coefficient paired with a small beta weight indicates that there is shared variance between variables with some of the shared variance being assigned to another variable (Nathans et al., 2012). The near-zero beta weight and small squared structure coefficient for *Beliefs* suggest that *Beliefs* was simply not contributing to the model.

Commonality analysis results. Conducting a commonality analysis provides a much richer picture of the variables by decomposing the R^2 into common and unique variance thus, partitioning the regression effect into nonoverlapping parts (Thompson, 2006). The commonality coefficients provide two types of information: the unique effects that reflect the amount of unique (i.e., not shared) variance an independent variable contributes (Zientek & Thompson, 2006), and the commonality coefficient which quantifies the pattern and extent of the independent variables' overlap in predicting the dependent variable variance (Mood, 1971; Nathans et al., 2012). The sums of the unique and common parts are equal to R^2. For the variable *Knowledge*, the unique contribution equaled 20.24% and the common contribution equaled 24.56%. This result, along with the beta weights and structure coefficients, indicate that *Knowledge* contributed the largest amount of variance to administrators' perceptions of their evidence-based decision-making practices. The commonality analysis for *Self Confidence* resulted in the unique contribution of 02.17% and the common contribution of 24.49%, which indicates *Self Confidence*, is a noteworthy predictor of practices but shares the majority of the variance with *Knowledge*. Last, the contribution of *Beliefs*

equaled a unique contribution of 00.59% and the common contribution of -00.56%. Negative commonality coefficients can be due to suppressor effects. Because the negative value was so close to zero, the estimate can simply be considered to be zero. Table 28 provides the unique and common contributions of the independent variables in this study.

Table 28. *Unique and common components of shared variance (R^2) for regression results with administrators' Perceptions of Practices as the dependent variable.*

Predictors/Partitions	Predictors			Total
	Knowledge	Self Confidence	Beliefs	
U(Knowledge)	20.24%			20.24%
U(Self-Confidence)		2.17%		2.17%
U(Beliefs)			0.59%	0.59%
C (Knowledge, Self-Confidence)	25.02%	25.02%		25.02%
C(Knowledge, Beliefs)	-0.21%		-0.21%	-0.21%
C(Self-Confidence, Beliefs)		-0.22%	-0.22%	-0.22%
C(Knowledge, Self-Confidence, Beliefs)	-0.10%	-0.10%	-0.10%	-0.10%
Unique	20.38%	1.41%	0.62%	
Common Total	24.56%	24.49%	-0.56%	
Total	44.94%[a]	25.9%[a]	0.06%[a]	47.49%[b]

Note. U= Unique, C = Common.
a. A squared Pearson *r* of the predictor with *Y.*
b. R^2 for all the predictors together.

To better understand the impact of each variable based on the administrator level, means and standard deviation are displayed in Table 29. Based on this data, directors experienced higher scores on *Knowledge* (*M* = 4.610, *SD* = .512*)* and *Perceptions of Practices* (*M* = 4.834, *SD* = .714) than did superintendents scores on *Knowledge* (*M* =

4.472, *SD* = .568) and *Perceptions of Practices* (*M* = 4.652, *SD* = .754). However, superintendents had higher scores on *Self Confidence* (*M* = 4.412, *SD* = .975) and *Beliefs* (*M* = 3.872, *SD* = .839) than directors (*M* = 4.008, *SD* = 1.151 and *M* = 3.794, *SD* = .870).

Table 29. *Means and standard deviations for each variable by administrator position type (n = 268).*

		Knowledge		Self Confidence		Beliefs		Practice	
Position	*N*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Director Level	151	4.610	.512	4.008	1.151	3.794	.870	4.834	.714
Superintendent Level	117	4.472	.568	4.142	.975	3.872	.839	4.652	.754

Note. *M* = Mean; *SD* = Standard deviation

Research Question II

To answer research question II regarding the extent that central-office administrator's individual characteristics of education, experience, and employment predict their perceptions of their evidence-based decision-making practices, analysis of variances (ANOVAs) were conducted. ANOVAs were chosen due to the continuous predictor variable and the categorical independent variables. Also, a Bonferroni correction was applied due to the four ANOVAs conducted for the three categorical dependent variables. Results that had a *p* value less than .0167 (i.e., .05/3) were considered statistically significant. Tukey post-hoc tests were conducted for statistically significant differences.

Administrator education. Administrator's level of education was measured by their highest completed degree of (1) Bachelor (n = 7), (2) Master (n = 197), (3) Ed.D (n = 52), or (4) Ph.D (n = 12). The assumption of homogeneity of variances was not violated as assessed by the Levene's test (p = .806). Statistically significant differences did not exist between level of education on administrators' perceptions of their evidence-based decision-making practices (F [3, 264] = 2.374, p = .071). The effect size was small for level of administrator education, but somewhat noteworthy (η^2 = .025). No post hoc analyses were conducted. However, mean perceptions of practice scores presented in Table 30 suggest that administrators with a Ph.D experienced higher scores on *Perceptions of Practices* than the administrators with the other education levels.

Table 30. *Means and standard deviations of administrators' Perceptions of Practices by level of education (n = 268).*

				95% Confidence Interval for Mean			
Education	*n*	Mean	*SD*	Lower Bound	Upper Bound	Minimum	Maximum
Bachelor	7	5.048	.651	4.446	5.649	4.333	6.000
Master	197	4.882	.791	4.770	4.993	1.000	6.000
Ed.D	52	5.051	.681	4.862	5.241	3.333	6.000
Ph.D.	12	5.417	.605	5.032	5.801	4.333	6.000
Total	268	4.943	.767	4.851	5.035	1.000	6.000

Note. SD = Standard deviation.

Administrator experience. Administrators' years of experience were measured by five categories: (1) less than 1 year, (2) 1 to 3 years, (3) 4 to 6 years, (4) 7

to 9 years, and (5) 10 or more years of experience. The means and 95% CI are provided in Table 31. The assumption of homogeneity of variances was not violated as assessed by the Levene's test (p = .119). Statistically significant differences were not obtained between administrator experience on *Perceptions of Practices* (F [4, 263] = 1.356, p = .250). The effect size for administrator experience on *Perception of Practices* was small (η^2 = .020), and no post hoc analyses were conducted.

Table 31. *Means and standard deviations of administrators' Perceptions of Practices by years of experience (n = 268).*

				95% Confidence Interval for Mean			
Experience	*n*	Mean	*SD*	Lower Bound	Upper Bound	Min	Max
Less than 1 year	7	4.810	1.016	3.870	5.749	3.667	6.000
1 to 3 years	8	5.000	.436	4.635	5.365	4.333	5.667
4 to 6 years	27	5.259	.518	5.045	5.464	4.333	6.000
7 to 9 years	43	4.930	.768	4.694	5.167	3.000	6.000
10 or more years	183	4.902	.793	4.786	5.017	1.000	6.000
Total	268	4.943	.767	4.851	5.035	1.000	6.000

Note. Min = Minimum; Max = Maximum. No post-hoc tests because results were not statistically significant.

Administrator employment. The length of time administrators had been in their current employment position was measured to determine if the amount of time in their current position could predict the use of evidence-based decision-making practices. Time in current position was measured by five categories: (1) less than 1 year, (2) 1 to 3 years, (3) 4 to 6 years, (4) 7 to 9 years, and (5) 10 or more years in their current

employment position. The means and standard deviations are provided in Table 32. Again, the assumption of homogeneity of variances was not violated as assessed by the Levene's test (p = .786). Statistically significant differences were not obtained regarding the number of years in current employment position on practices (F [4, 263] = .658, p = .622; p > .0125). The effect size for time in current employment position was not noteworthy (η^2 = .010), and no post hoc analyses were conducted. Table 32 displays the means, standard deviations, and 95% confidence intervals for perceptions of evidence-based decision-making practices by years in current position.

Table 32. *Means and standard deviations of Perceptions of Practices by years in current position (n = 268).*

				95% Confidence Interval for Mean			
Employment	*n*	Mean	*SD*	Lower Bound	Upper Bound	Min	Max
Less than 1 year	36	4.814	.867	4.521	5.108	1.667	6.000
1 to 3 years	79	5.042	.659	4.894	5.189	3.000	6.000
4 to 6 years	61	4.928	.777	4.729	5.128	2.667	6.000
7 to 9 years	45	4.881	.788	4.644	5.118	3.000	6.000
10 or more years	47	4.950	.828	4.707	5.193	1.000	6.000
Total	268	4.942	.766	4.850	5.034	1.000	6.000

Note. Min = Minimum; Max = Maximum. No post-hoc tests because results were not statistically significant.

Summary of results for research question II. The results of the analyses suggest that administrators' education, experience, and employment were not good predictors of administrators' perceptions of evidence-based decision-making practices. Statistical significance was not obtained for any of the three predictors and the effect

sizes for experience and employment were small and not noteworthy. However, albeit small, the effect size for level of education was minimally noteworthy and comparisons of means suggested that administrators with a Ph.D. scored higher on practices than administrators with a bachelor, master, or Ed.D. level degree. Due to the small number of respondents, only 12 had a Ph.D., future research needs to be conducted to further examine the generalizability of this result.

Research Question III

To answer research question III regarding the prediction of evidence-based decision-making practices of central-office administrators by their 'school districts' characteristics such as type (3 categories), size (10 categories), geographic location (5 categories), and policies (yes, no, unsure), ANOVAs were conducted. Due to the continuous predictor variable and each independent variable being categorical, ANOVA was determined to be an appropriate analysis. Additionally, because ANOVAs were conducted for the four categorical independent variables, a Bonferroni correction was applied. Results that had a *p* value less than .0125 (i.e., .05/4) were considered statistically significant.

School district type. There were three categories used to measure school district type on *Perceptions of Practices*: (1) rural, (2) suburban, and (3) urban. The assumption of homogeneity of variances was not violated as assessed by the Levene's test ($p = .256$). Statistically significant differences existed between rural districts ($n = 183$), suburban districts ($n = 67$), and urban ($n = 18$) districts on practices (F [2, 265] = 7.20, $p = .001$), with a moderate effect size for school district type ($\eta^2 = .05$). A Tukey post-hoc test

indicated that statistically significant differences occurred between rural and suburban school districts. Rural district administrators experienced lower scores on *Perceptions of Practices* than suburban administrators as indicated by the mean practice score in Table 33. Figure 15 provides the plots of the means.

Table 33. *Means and standard deviations of administrators' Perceptions of Practices by district type (n = 268).*

District Type	*n*	Mean	*SD*	95% Confidence Interval for Mean		Minimum	Maximum
				Lower Bound	Upper Bound		
Rural	183	4.83_a	0.771	4.713	4.938	1.000	6.000
Suburban	67	5.21_a	0.621	5.062	5.366	3.667	6.000
Urban	18	5.14	0.944	4.660	5.599	3.000	6.000

Note. Means with the ***same*** subscripts (e.g., "***a***" and "***a***") were found to be different to a statistically significant degree ($p = .05$).

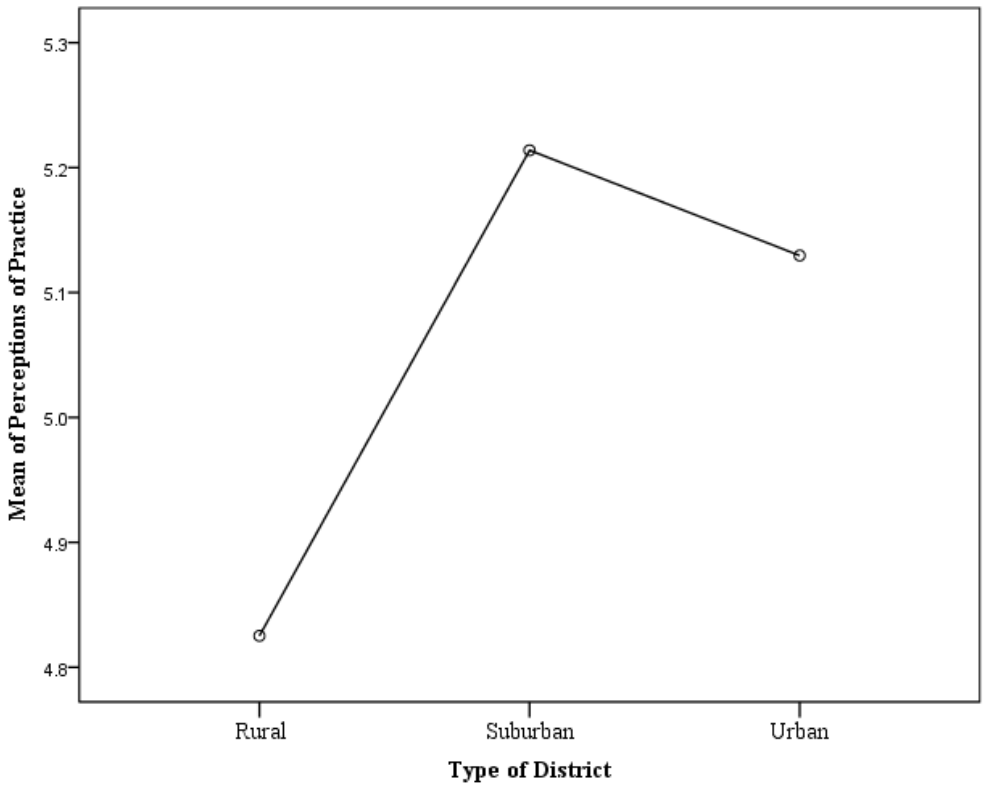

Figure 15. Plots of the means of administrators' *Perceptions of Practices* by type of district (*n* = 268).

Figure 16 provides the 95% confidence intervals for the means by school district type. The nonoverlapping confidence intervals support that there were statistically significant differences in the means for *Perception of Practices* for rural and suburban school districts. The wide confidence interval for urban districts was likely due to the small sample size. The boxplot comparisons in Figure 17 illustrate the variation of scores across school district type. The line in the middle of the boxes are the median values.

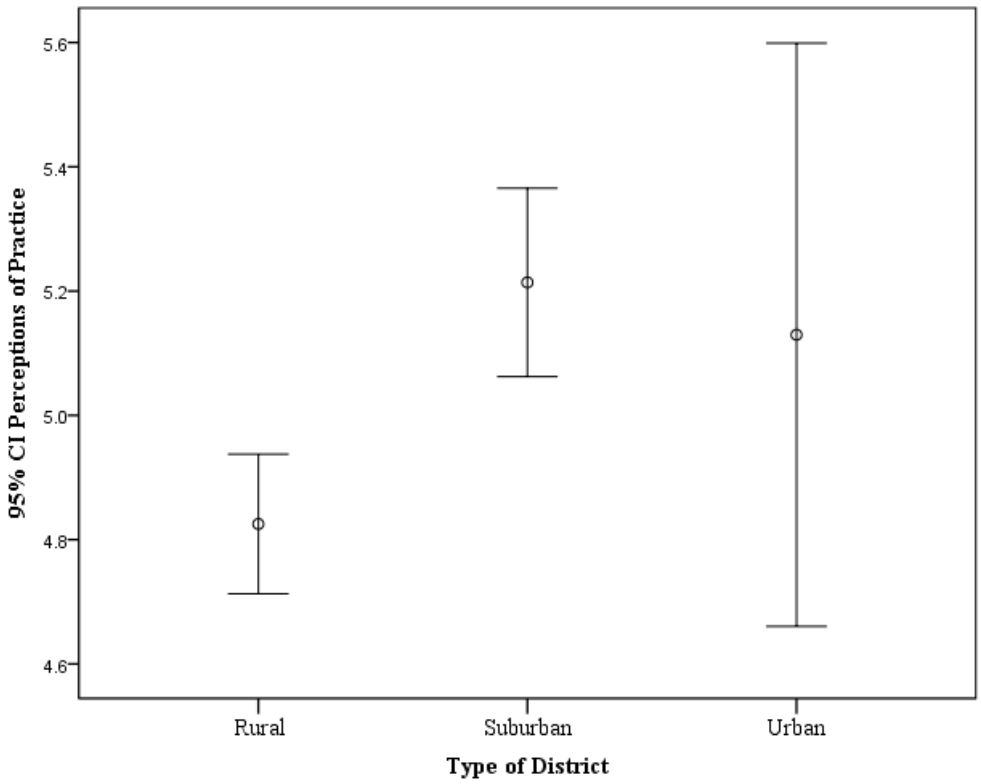

Figure 16. Confidence intervals for means of administrators' *Perceptions of Practices* by type of district (n = 268).

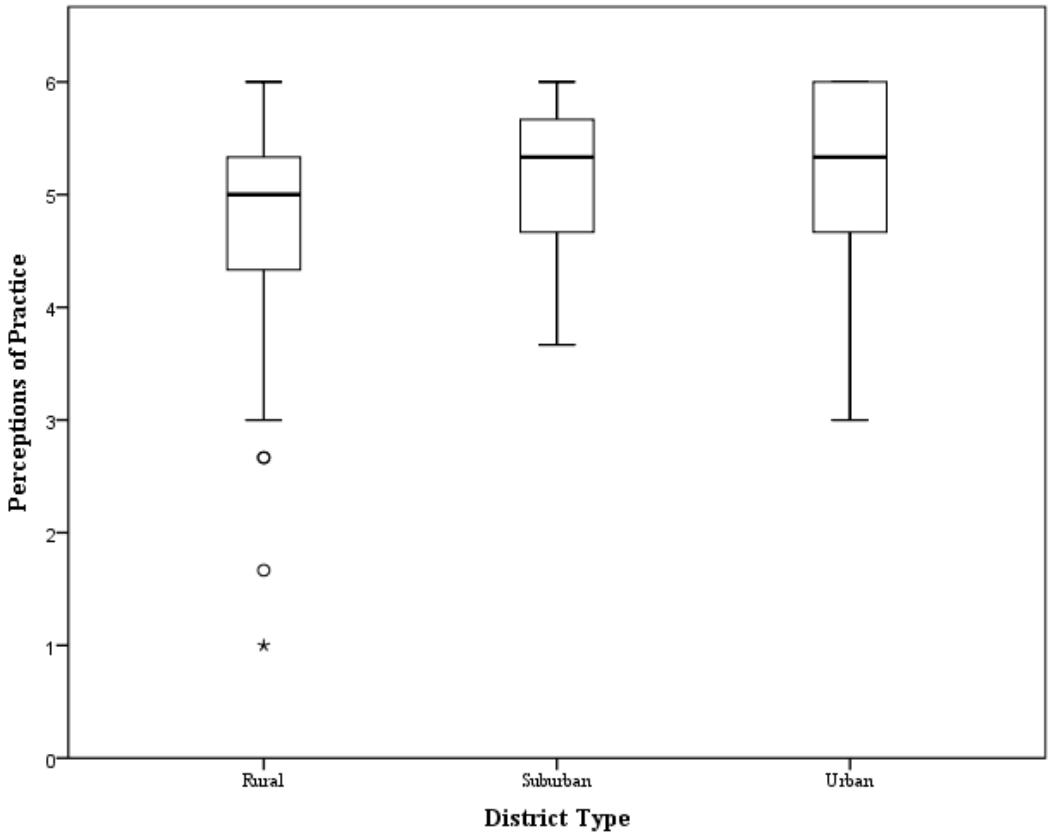

Figure 17. Boxplot comparisons of administrator's *Perceptions of Practices* by type of district (n = 268).
Note. Stars and circles represent outliers.

School district size. There were 10 categories for school district size: (1) under 500 students; (2) 500 to 999 students; (3) 1,000 to 1,599 students; (4) 1,600 to 2,999 students; (5) 3,000 to 4,999 students; (6) 5,000 to 9,999 students; (7) 10,000 to 24,999 students; (8) 24,000 to 49,999 students; (9) 50,000 students or more; and (10) shared services arrangements. The assumption of homogeneity of variances was not violated as assessed by the Levene's test (p = .099). Statistically significant differences existed between district size under 500 students (n = 40) and district size from 1,000 to 1,599 students (n = 31), and between district size under 500 students (n = 40) and district size

from 5,000 to 9,999 students (n = 35) on perceptions of evidence-based decision-making practices (F [9, 258] = 2.521, p = .009), with a moderate effect size for school district size (η^2 = .08). A Tukey post-hoc test indicated that statistically significant differences occurred between district sizes 1 and 6 as well as district sizes 1 and 3; however, there was no statistically significant difference between district sizes 3 and 6. School districts with under 500 students had lower scores on *Perceptions of Practices* than any other district size as indicated by the mean scores in Table 34.

Table 34. *Means and standard deviations of administrators' Perceptions of Practices by school district size (n = 268).*

School District Size	*n*	Mean	*SD*	95% CI for Mean Lower Bound	95% CI for Mean Upper Bound	Min	Max
Less than 500	40	$4.542_{a,b}$	.780	4.292	4.791	1.667	6.000
500 to 999	38	4.912	.594	4.717	5.107	3.333	6.000
1,000 to 1,599	31	5.204_{a}	.619	4.977	5.431	3.667	6.000
1,600 to 2,999	36	4.861	.723	4.616	5.106	2.667	6.000
3,000 to 4,999	37	4.946	.799	4.679	5.212	2.667	6.000
5,000 to 9,999	35	5.152_{b}	.633	4.935	5.370	3.667	6.000
10,000 to 24,999	22	5.167	.570	4.914	5.420	4.000	6.000
25,000 to 49,999	5	5.128	.938	4.561	5.695	3.333	6.000
50,000 or more	16	4.944	1.020	3.874	6.015	3.000	5.667
Shared Services	6	4.667	1.432	3.643	5.691	1.000	6.000
Total	268	4.943	.767	4.851	5.035	1.000	6.000

Note. CI= Confidence Interval; Min = Minimum; Max = Maximum. Means with the ***same*** subscripts (e.g., "***a***" and "***a***") were found to be different to a statistically significant degree (p = .05).

Figure 18 provides the means and Figure 19 provides the 95% confidence intervals for the means by the number of students in the school district. The nonoverlapping confidence intervals support that there were statistically significant differences for the means for administrators' perceptions of their evidence-based decision-making practices between school districts with under 500 students and rural and suburban school districts. Although an examination of the confidence intervals suggest there may be differences between districts with under 500 students and school districts with 10,000 to 24,999, those differences were not detected in the post-hoc test. The standard deviation for the means on *Perceptions of Practices* was smaller for respondents from the school districts with 10,000 to 24,999 students.

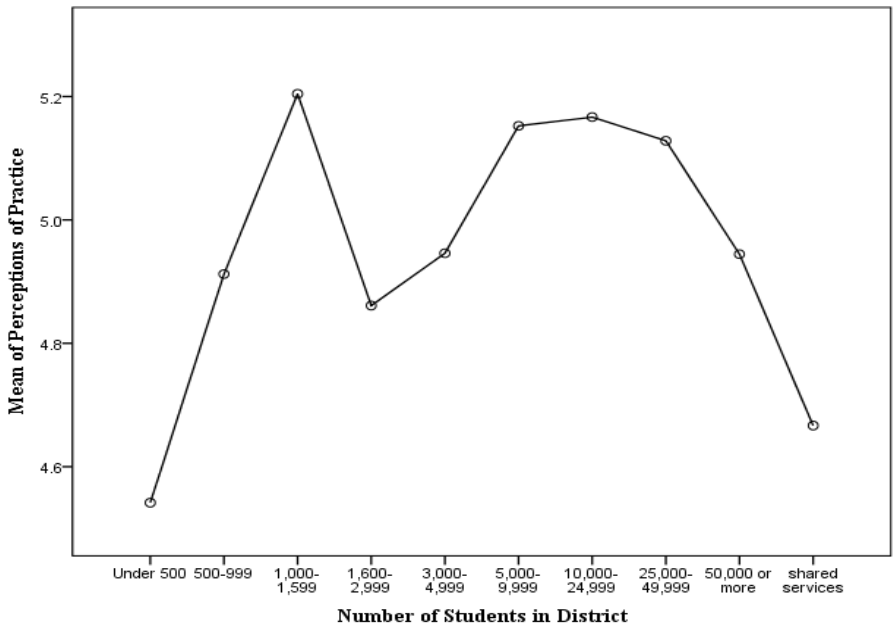

Figure 18. Plots of the means of administrators' *Perceptions of Practices* by size of district (*n* = 268).

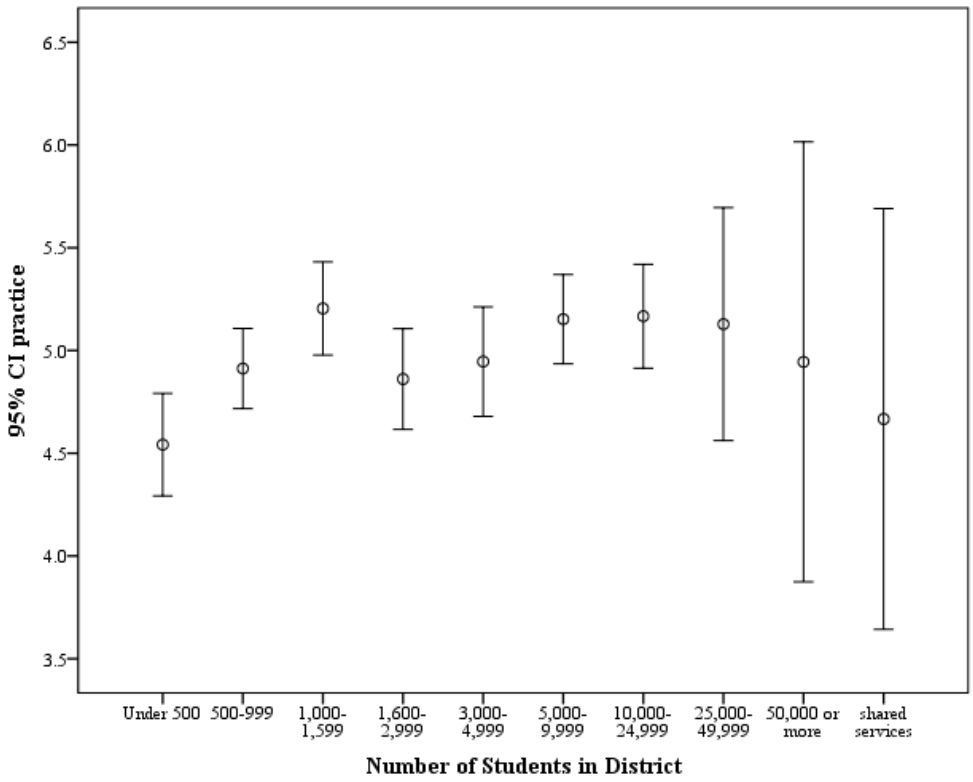

Figure 19. Confidence intervals for means of administrators' *Perceptions of Practices* by district size (n = 268).

School district geographical location. School districts in Texas are divided into 20 regions throughout the state. For the purposes of looking at differences in regions, districts were grouped into five geographical locations: (a) north, (b) south, (c) east, (d) west, and (e) central. The north geographical location was composed of the districts in the regional service center areas of 8, 9, 10, 11, and 16. The south geographical location was composed of regional service centers 1, 2, 3, and 20. The east geographical location was composed of regional services centers 4, 5, 6, and 7. The west geographical location was composed of the regional service centers 17, 18, and 19. Last, the central geographical location was composed of the regional service centers of 12, 13, 14, and 15

(see Appendix E for a map of grouping regional service centers). The assumption of homogeneity of variances was not violated as assessed by the Levene's test (p = .360). Geographical location differences were not statistically significant between north (n = 65), south (n = 40), east (n = 73), west (n = 28), and central (n = 62) on perceptions of evidence-based decision-making practices (F [4, 263] = .518, p = .723) which also had a small effect size (η^2 = .008). Because the results were not statistically significant no post hoc analyses were conducted. Descriptive statistics are provided in Table 35.

Table 35. *Means and standard deviations of administrators' Perceptions of Practices by geographical location (n = 268).*

				95% Confidence Interval for Mean			
Regions	*N*	Mean	*SD*	Lower Bound	Upper Bound	Min	Max
North	65	4.995	.732	4.813	5.176	3.000	6.000
South	40	4.942	.773	4.694	5.189	2.667	6.000
East	73	5.005	.602	4.864	5.145	3.667	6.000
West	28	4.809	.932	4.448	5.171	1.667	6.000
Central	62	4.876	.892	4.650	5.103	1.000	6.000
Total	268	4.943	.767	4.851	5.035	1.000	6.000

Note. SD = Standard Deviation; Min = Minimum; Max = Maximum. No post-hoc tests were conducted because results were not statistically significant.

School district policies. To determine if having district policies in place could predict the use of evidence-based decision-making practices, school district administrators were asked if there were policies in place that govern evidence-based

decision-making practices in their districts. The categories administrators could choose from for this question were: (1) yes, (2) no, and (3) I am not sure. The assumption of homogeneity of variances was not violated as assessed by the Levene's test (p = .114). Having policies in place was statistically significant based on administrator responses of yes (n = 125), no (n = 114), and I am not sure (n = 26) on perceptions of practice (F [2, 265] = 3.942, p = .021) with a noteworthy effect size (η^2 = .03). Descriptive statistics are provided in Table 36. Interpretation of those values and the somewhat noteworthy effect size suggest administrators' perceptions of their practices was higher, on average, for the administrators who indicated their school district had a policy, compared to administrators who were not sure if a policy existed. A Tukey post-hoc test confirmed statistically significant differences exist between those who indicated yes and those who were unsure.

Table 36. *Means and standard deviations of administrators' Perceptions of Practices by the existence of school district policies (n = 268).*

				95% Confidence Interval for Mean			
Policy	*n*	Mean	*SD*	Lower Bound	Upper Bound	Min	Max
Yes	128	5.068_a	.776	4.932	5.203	1.667	6.000
No	114	4.863	.660	4.740	4.985	2.667	6.000
Not Sure	26	4.679_a	1.031	4.263	5.096	1.000	6.000
Total	268	4.943	.7666	4.851	5.035	1.000	6.000

Note. SD = Standard deviation. Means with the ***same*** subscripts (e.g., "***a***" and "***a***") were found to be different to a statistically significant degree (p = .05).

Figure 20 provides plots of the means. As seen in Figure 20, the means for having a policy were higher than the means for the administrators' who were not sure

about a policy. Figure 21 provides the 95% confidence intervals for the means. Even though the results were statistically significant, the confidence intervals overlapped. Notice that the sample size is small for the "Not Sure" category; thus, the margin of error was large.

When examining CIs, Cumming and Finch (2005) have provided a *"Rule of Eye"* for interpreting overlapping confidence intervals. First, to better understand their interpretations of CIs, they described a CI as, "a range of plausible values for μ. Those outside of the CI are relatively implausible" (p. 174). Cumming and Finch (2005) also noted that it is important to think of CIs in the sense that if an experiment were repeated over and over and a CI calculated each time, one could expect that the interval would include the mean 95% of the time. With that in mind, the *Rule of Eye* makes sense that as long as the overlap is no more than half of the average margin of error, the *p* value would be no more than .04 or .05 (Cumming, 2011; Cumming & Finch, 2005). In this study, the administrators' *Perception of Practices* was based on whether or not the district had policies and procedures in place concerning evidence-based practices. When looking at Figure 21 you can see that the *Rule of Eye* is supported by the Tukey post-hoc tests indicating that statistically significant differences exist between those who indicated yes and those who were unsure.

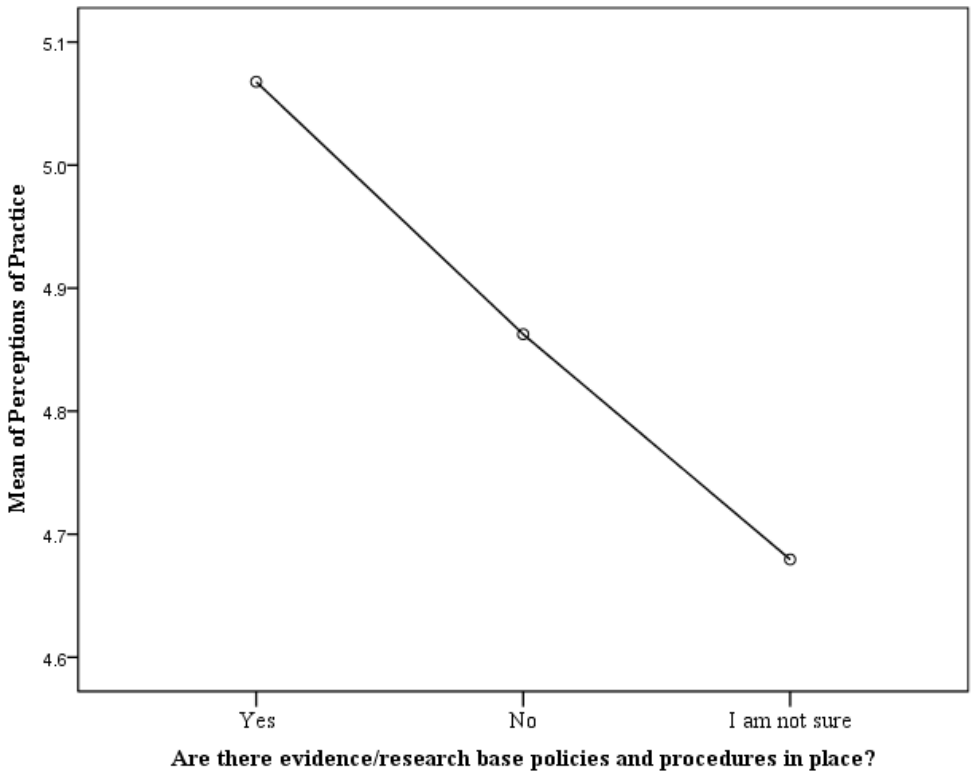

Figure 20. Plots of means of administrators' *Perceptions of Practices* by whether or not policies were in place (n = 268).

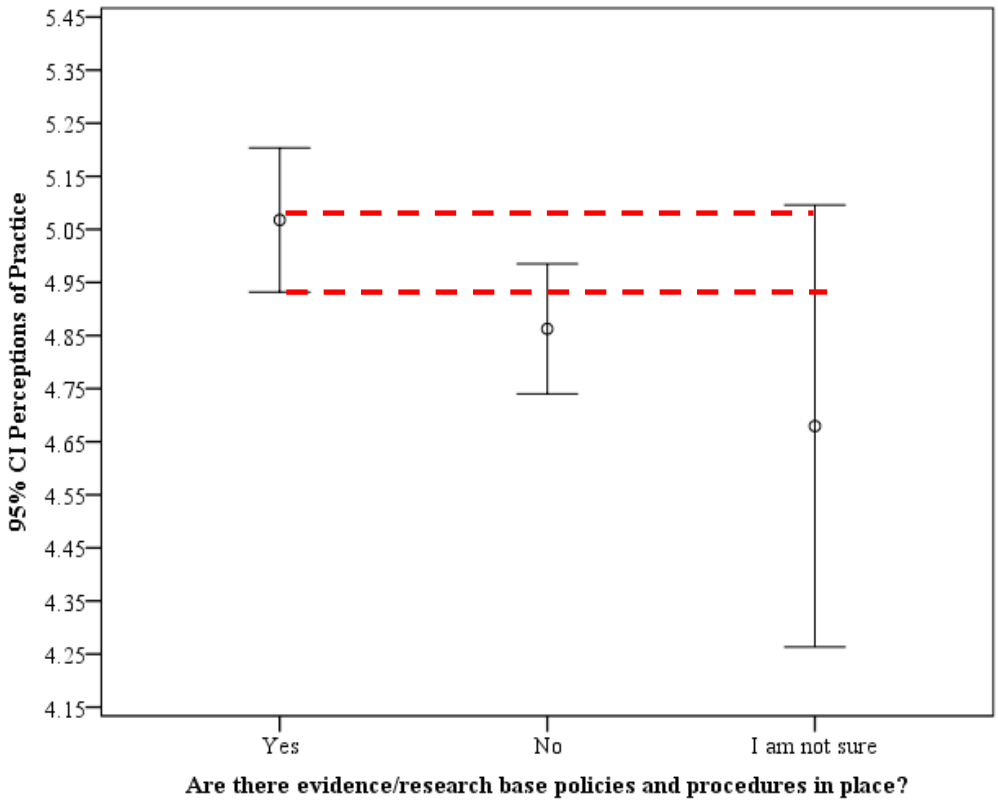

Figure 21. Confidence intervals for means of administrators' *Perceptions of Practices* by whether or not policies were in place (n = 268).

Summary of results for research question III. In answering the third research question regarding the ability to predict administrators' perceptions of their evidence-based decision-making practices by district type, size, geographical location, and the presence of district policies, the data indicated that district geographic location was not a statistically significant predictor. The data did indicate that type, size, and the presence of policies did explain variance in administrators' perceptions of their evidence-based decision-making practices.

Because it is feasible to think that rural districts could have a smaller number of students, crosstabs were conducted by school district size and district type. The results provided in Table 37 indicate that all of the districts with less than 500 students were rural school districts. There were statistically significant differences between the school districts with 1,000 to 1,599 students and school districts with 5,000 to 9,999 students. While 71% of the 5,000 to 9,999 school districts were suburban, only 11% of the 1,600 to 2,999 school districts were classified as suburban.

Table 37. *Crosstabs of district size by district type (n = 268).*

	District Type		
Size	Rural	Suburban	Urban
Under 500	100%	0%	0%
500-999	95%	5%	0%
1,000-1,599	88%	8%	3%
1,600-2,999	86%	11%	3%
3,000-4,999	79%	21%	0%
5,000-9,999	21%	71%	8%
10,000-24,999	4%	70%	26%
25,000-49,999	7%	57%	36%
50,000 or more	0%	57%	43%
SSA	100%	0%	0%
Column Totals	69%	25%	6.6%

Table 38. *Crosstabs of district type by policies in place (n = 268).*

	Policies in Place			
Type	Yes	No	Not Sure	Totals
Rural	85	82	16	183
Suburban	34	27	6	67
Urban	9	5	4	18
Totals	128	114	26	268

Research Question IV

Administrators are required to ensure that the interventions and programs implemented in their districts meet the evidence-based requirements in federal law (NCLB, 2002; IDEIA, 2004). Research question IV examined the level within the school district at which evidenced-based practice decisions were made. As seen in Table 39, the largest percent of evidence-based decisions were made by superintendents, followed by program directors/budget managers. Because type of district was a predictor of administrators' *Perceptions of Practices*, an investigation of the administrator level of decision making and district type was warranted. Table 39 provides the frequencies and percent of each administrator level of decision-making. As seen in Figure 22 overall, superintendents made the majority of the evidence-based decisions (42.9%). The data were disaggregated further to look at the decision-making level by the type of district. Decisions in rural districts were made primarily at the superintendent level. In suburban districts the program director/budget manager made most of the district's evidence-based decisions and in urban districts the assistant superintendent and the program directors were identified as the decision-maker about two-thirds of the time.

Table 39. *The administrator level at which evidence-based decision-making practice decisions were made (n = 268).*

Level	Frequency	Percent
Campus level	21	7.8
Program directors/budget managers	70	26.1
Assistant Superintendent	39	14.6
Superintendent	115	42.9
Other	23	8.6
Total	268	100.0

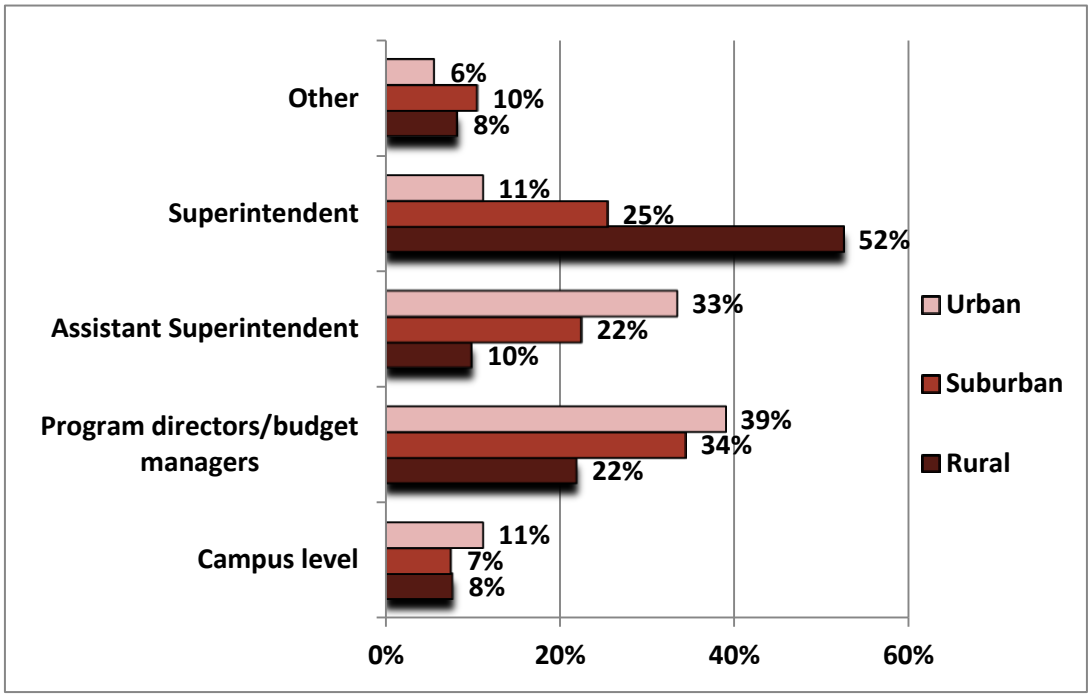

Figure 22. Level decisions were made disaggregated by type of district (*n* = 268).

CHAPTER V

CONCLUSIONS

There have been few studies concerning how or if central office administrators use evidence-based practices to inform their decision making. Previous studies have been qualitative studies that examined the practices of central office administrators in a single district or a few mid-size districts. Results of these studies indicated that administrators' use of evidence-based practices has been either minimal or symbolic (Coburn, Honig, & Stein, 2009; Coburn & Talbert, 2006; Coburn, Toure, & Yamashita, 2009; Farley-Ripple, 2008). The present research expanded the realm of previous studies concerning administrators' use of evidence-based decision-making and provided a quantitative look at administrators' practices, encompassing central office administrators throughout the state of Texas. By broadening the scope of previous studies, the present study was able to collect data from districts and administrators with varying characteristics, allowing for a more comprehensive look at central office administrators and evidence-based practices. As a result, this study provides several contributions to current research.

Contributions

Larger varied sample. Previous studies on central-office administrators' evidence-based decision-making practices have been limited to a single large district or administrators from only a few mid-size districts. Previous studies have not examined central office administrators' evidence-based practices across an entire state or employed

a sample with varying characteristics and a wide variety of differences in district and central office administrator characteristics. The present study encompassed central office administrators throughout the state of Texas (n = 268) and included a wide range of districts and administrators with varying characteristics. This broader perspective allowed for a more comprehensive look at the effects of district and administrator characteristics on the perceptions of administrators' use of evidence-based decision-making practices. Figures 1 through 8 provide a graphic representation of the indicators used to describe the sample.

Representativeness of the sample. Previous studies have been based on single case research or small group longitudinal studies in which there were no comparisons of the sample to the population. The present study expanded the scope of research currently found in the literature about central office administrator evidence use by including central office administrators across the entire state of Texas. To explore representativeness of the sample, district and administrator characteristics of the population that are routinely collected by the Texas Education Agency and available through the Texas Education Agency Directory, *Ask*TED were compared to the sample data in this study. Tables 1 through 8 provide comparisons of district and sample data and the results of the K-S Test for each of the elements used to establish the possibility that the sample was representative of the population. The Kolmogorov-Smirnov (K-S) Two Independent Samples Test examined the data in the sample and the population to determine if the two data sets were similar or if they differed to a statistically significant degree. Results of the K-S tests indicated that the sample and the population were similar

in all areas except for district size for districts with under 500 students (Table 6). These comparisons of sample and population and the results of the K-S tests disclosed minimal differences, indicating that the sample in the present study was possibly representative of the population as regards, administrator characteristics (gender and position type) and district characteristics (size and geographical location).

Preliminary Analyses

The purpose of this study was to examine administrators' perceptions of their evidence-based decision-making practices and to identify factors that predict evidence use. Factors such as administrator characteristics, district characteristics, as well as administrators' *Knowledge*, *Beliefs*, *Self Confidence* and *Perceptions of Practices* were examined. The quantitative approach and broadened scope of the present investigation brings a different perspective to current literature on central office administrator evidence-based decision-making.

Self confidence in statistics. Preliminary analyses were conducted to prepare the data for further analysis in answering each of the research questions. An exploratory factor analysis was conducted for administrators' *Self Confidence* in statistical methodology and analysis. Table 18 and Figure 14 indicate that the factor structure for the administrators' *Self Confidence* instrument was unidimensional.

All administrators' practices. An exploratory factor analysis for All Administrators' Practices determined the factor structure and summarized the relationship between variables (Goldberg & Digman, 1994) resulting in a more parsimonious set of scores to be used in the subsequent analyses (Thompson, 2004).

The pattern and structure coefficients results suggested the need to delete two items. An exploratory factor analysis was then conducted with those two items deleted. Table 15 contains the factor analysis results, and Figure 12 provides the scree plot identifying the three factors for All Administrator Practices. Structure coefficients and pattern coefficients outline the alignment of variables within each factor. Tables 16 and 17 provide a matrix of pattern coefficients and structure coefficients for the variables and the alignment of variables within each factor which supported the existence of three factors.

A bootstrap factor analysis was conducted by resampling from the existing data 1000 times. Because a promax rotation was conducted, the focus of the bootstrap factor analysis was on the boostrapped eigenvalues for All Administrators' Practices. Figure 13 illustrates the empirically estimated sampling distribution of the 15 eigenvalues for All Administrators' Practices, and Table 18 contains the comparison of the eigenvalues from the sample and the empirically estimated eigenvalues based on the results across the 1000 resamples. The bootstrapped results found that the mean for the 1000 eigenvalues produced was larger than one for the third factor and less than one for the fourth factor. The range for the 1000 bootstrap results indicated that for the third factor some resamples produced an eigenvalue as low as 0.90 and some resamples produced an eigenvalue as high as 1.39. Although the determination was made to retain three factors, it must be acknowledged that different compositions of people from the sample could result in a two-factor structure.

Findings

To gain insights into central office administrators' perceptions of evidence-based decision-making practices and the factors that influence them, four research questions were investigated. The first research question employed multiple regression and commonality analyses to determine the extent to which administrators' *Knowledge*, *Beliefs*, and *Self Confidence* in statistical methodology and analysis could predict administrator *Perceptions of Practices*. Questions two and three utilized ANOVA analyses to investigate the impact of administrator characteristics and district characteristic, as regards administrators' perceptions of practices. The fourth and final question took a brief look at the organizational structure of districts by examining the organizational level within the central office where final evidence-based decisions were made.

Research question I. To what extent does administrators' (a) *Knowledge*, (b) *Beliefs*, and (c) *Self Confidence* concerning statistical methodology and analysis predict administrators' perceptions of their evidence-based decision-making practices?

Coburn, Toure, and Yamashita (2009) explained that evidence-based decision making is a complex task requiring administrators to first be able to identify evidence, then access it, and then interpret it before it can be used in decision-making. Essentially, before evidence can be used to guide decision-making, administrators must have knowledge of evidence-based practices to know what evidence is and what it is not, they must know how and where to find it, and most importantly have the ability to interpret it once it is found. The present study sought to test that assumption by determining the

extent to which central-office administrators' knowledge of evidence-based practices (*Knowledge*), beliefs about research (*Beliefs*), and administrators' self-confidence in statistical methodology and analysis (*Self Confidence*) could predict administrators' perceptions of their evidence-based decision-making practices (*Perceptions of Practices)*. Data collected from central office administrators across the state of Texas were analyzed using multiple regression and commonality analysis.

Knowledge, *Beliefs*, and *Self Confidence* explained 47.5% of the variance in administrators' perceptions of their evidence-based decision-making practices. In analyzing the data, both beta weights and structure coefficients were examined to ensure correct interpretation (Courville & Thompson, 2001). The large beta weight and squared structure coefficient for *Knowledge*, as provided in Table 27 indicate that *Knowledge* is a good predictor of *Perceptions of Practices*. In addition, the large squared structure coefficient for self-confidence indicates that self-confidence is also an important predictor (i.e. 75.17%). Likewise, the commonality analysis results, which aids in determining the extent of the explained variance that was shared across all combinations of predictors and how much explained variance was unique to a specific predictor (Thompson, 2006a), showed that *Knowledge* and *Self Confidence* share variance but that *Knowledge uniquely* contributes 45% of the 47.5% explained variance (i.e., 20.28/47.5 %).

Almost all of the remaining contributions made by *Knowledge* were shared with *Self Confidence* as seen in Table 28. Self-confidence explained 25.90% of the variance in practices although 24.49% was shared with *Knowledge*. Neither *Knowledge* nor S*elf*

Confidence shared variance in common with beliefs. The negative commonality coefficients can indicate the presence of a suppressor effect but the value was essentially zero.

The literature is replete with studies on the use of evidence-based practices in decision-making based on professionals in fields other than school district central-office administrators (Bryar et al., 2003; Funk et al., 1991). Much of this research approached the investigations of evidence use by examining the barriers or obstacles that led to resistance by many professionals concerning the use of research in their decision-making. Studies examining the barriers to evidence use began in the medical field and there is extensive research on the barriers to evidence-based decision-making in the field of nursing (Bryar et al., 2003; Funk et al., 1991; Hunt, 1981). And, although research on the use of evidence in education is easily obtained, the research on evidence use by central office administrators is limited (Corcoran, 2003; Fleischman, 2006; Kohlmoos & Joftus, 2005; Slavin, 2008). Therefore, this study contributes to the research base by examining a new group of educators.

Characteristics such as skepticism about research, not having time or skills to read and access current research, and feelings that research may not be useful to them, were all noted as being barriers to the use of evidence in decision-making (Bryar et al., 2003; Funk et al., 1991). Based on these studies, the present study examined characteristics of administrators' *Knowledge* of evidence-based practices, *Beliefs* about using research, and *Self Confidence* in interpreting statistics to determine if and to what

extent these characteristics could predict administrators' *Perceptions of Practices* concerning their own evidence-based decision-making.

At the core of evidence-based decision-making is the ability to interpret the statistics and evaluate the research in substantive ways before the evidence can be used to make a decision (Coburn, Honig, & Stein, 2009). The inability to interpret the statistical analyses were noted as one of the barriers to the use of evidence in decision-making in previous research (Bryar et al., 2003; Closs & Lewin, 1998; English, 1994; Funk et al., 1991; Hicks, 1995; Hunt, 1981). More recent studies concerning central office administrators indicated that many central office administrators' symbolic or conceptual use of evidence is likely due to concerns about administrators' ability to interpret and make meaning from various forms of research, as well as the ability to critically evaluate research, interpret the data, and draw implications from those results (Coburn, Honig, & Stein, 2009). The present study provides evidence of the importance of administrators' *Knowledge* and *Self Confidence* in their own ability to understand the statistical methodologies and analyses that are typically found in research studies; and although, administrator beliefs about research were investigated, the results from this sample did not support the importance of their beliefs in predicting administrators' perceptions of evidence-based decision-making.

Administrator beliefs about evidence use in decision-making were investigated in this study. The predictor *Beliefs* was comprised of items that examined the characteristics that have previously been identified as barriers to evidence use (Bryar et al., 2003; Funk et al., 1991; Ketetian, 1975). Beliefs such as skepticism about research,

ambiguity of research results, and difficulty in finding time to read research were investigated in the present study to determine administrators' abilities for predicting their perceptions of evidence-based decision-making. However, after the data were analyzed, the predictor *Beliefs* provided little information about administrators' *Perceptions of Practices* for this sample. Because the items in *Beliefs* were previously identified as factors that influenced the use of evidence in decision-making a closer look at the data was warranted.

Table 13 provides the descriptive statistics for the items for the factors *Knowledge, Beliefs, and Perceptions of Practices.* Results indicated the items in the factor *Beliefs* had the lowest means and largest standard deviations of all of the items. The three items that aligned with the factor *Beliefs* were, SKEPTICLR 11(*M* = 3.75, *SD 1.25),* READTIMER 3 (*M* = 3.53, *SD* = 1.35), and WRITE_CLRR 7 (*M* = 2.25, *SD* = 1.16). Even though the means for each of these items were the lowest of all items, they were in the mid to low range of possible scores. However, a different sample or sample size may have had a different outcome. But for this sample, the reliability coefficients were also low, meaning these items might not fully capture this construct. Yet, responses for the factor *Beliefs* were interesting. The statements that were linked to *Beliefs* were (a) I am still skeptical or research, (b) I feel research could be written in a clearer manner, and (c) I do not have time to read research to keep up on the newest evidence. Response choices for these statements ranged from 1-Strongly Disagree to 6-Strongly Agree. The means for these statements were in the mid to low range (*M* = 3.75, *M* = 3.53, and *M* = 2.25), indicating that administrators in this sample did not strongly agree with these

statements, rather their answers were more neutral or closer to disagreement. Based on these responses, it appears that the respondents were not exceedingly skeptical of research, they did not feel as if research was extremely unclear, nor did they indicate that they had a lot of difficulty finding time to read research.

When compared to the literature on attitudes or beliefs toward evidence-based decision-making the means were lower (disagreement) for these statements than anticipated. But considering that the push for evidence use in decision-making in the field of education has maintained its intensity for the last decade, the results of these data may indicate that this intensity could be altering beliefs about evidence use. Therefore, the implication of the mid-range scores may be that there is need for further research to be conducted to determine if these beliefs are really changing or perhaps this is a result of the symbolic use of evidence described by Coburn, Honig, and Stein (2009).

Research question II. To what extent can central-office administrator's individual characteristics of education, experience, and employment predict their perceptions of their evidence-based decision-making practices?

In any profession, individuals have varying characteristics that affect their daily work. For school district administrators, level of education, years of experience, and the type of employment or position held were investigated to determine if these variables could predict perceptions of evidence-based decision-making practices. Each variable was analyzed by employing an analysis of variance (ANOVA) and a Bonferroni correction, due to the categorical nature of the independent variables. Additionally,

Tukey post-hoc tests were conducted when the ANOVA results indicated a statistically significant difference.

Administrator education. Level of education was specified as the highest completed degree held by each administrator. Participants were asked to designate their level of education by indicating the highest degree completed as a (1) Bachelor's, (2) Master's, (3) Ed.D. or (4) Ph.D. degree. In the present study, 73.5% (n = 197) of administrators held a master's degree, which is typically required for school administrators and 2.7% (n = 7) of the participants held a Bachelor's degree. Doctoral degrees were held by 23.8% (n = 64) of the participants of which 19% (n = 52) held an Ed.D. and 4.5% (n = 12) held a Ph.D. Table 30 provides the means, standard deviations and 95% confidence intervals for level of education for the sample. The analysis did not yield a statistically significant result and the effect size was small (η^2 = .025) for the present sample. However, a review of the data and the difference between the mean scores of administrators with a Ph.D. (M = 5.417, SD = .605) and an Ed.D. (M = 5.051, SD =.681) was interesting and deserved further investigation.

Although the topic can be quite controversial, generally speaking Educational Doctorates (Ed.D.) have long been thought to be practitioner oriented, and the Doctor of Philosophy (Ph.D.) degree to be more focused on research and the acquisition of new knowledge (Baez, 2002; Dill & Morrison, 1985). One study which examined dissertations noted that dissertations completed in fulfillment of the Ph.D. degree contained more quantitative research employing multivariate statistics, as opposed to dissertations fulfilling the Ed.D. degree where qualitative studies were more prevalent

(Nelson & Coorough, 1994). However, a study by Kolbert and Brendel (1997) reviewed dissertations and determined that there was little difference in the requirements for the Ed.D. and the Ph.D. in many programs. A full examination of the controversy is well beyond the scope of the present study, yet with the current emphasis on research and evidence-based practices in education, further research concerning doctoral programs and preparation for evidence-based decision-making practices for school administrators may be warranted.

Administrator experience. Experience in educational leadership is commonly considered to be an important attribute for successful school district administrators. The value of experience has been recognized as an important factor in the everyday problem solving abilities of school administrators (Leithwood & Steinbach, 1991). Because experience has been noted to play an important role in effective leadership, the present study sought to determine if the overall administrative experience for central-office administrators could predict an administrator's perception of evidence-based practices. To examine the predictive ability of years of experience, administrator experience was measured by five categories: (1) less than 1 year, (2) 1 to 3 years, (3) 4 to 6 years, (4) 7 to 9 years, and (5) 10 or more years. There were 68.2% (n = 183) of the administrators with 10 or more years of administrative experience, 16% (n = 43) with 7 to 9 years of experience, 10% (n = 27) with 4 to 6 years of experience, 3% (n = 8) with 1 to 3 years of experience and .25% (n = 7) who had less than one year of experience. The means and standard deviations of scores on administrators' perceptions of their evidence-based decision-making practices by years of experience are displayed in Table 31.

The data were examined to determine if administrator overall experience could predict perceptions of evidence-based decision-making practices. Data indicated that more than half of the administrators in the sample had more than 10 years of experience (n = 183) and, although administrators with 4 to 6 years of experience had the highest mean scores (M = 5.259, SD = .518) on perceptions of evidence-based decision-making practices, there were no statistically significant differences between administrator scores based on the years of experience. The small differences as provided in Table 31 indicated that the administrators' years of experience did not appear to impact their perceptions of their evidence-based decision-making practices nor would they be a good predictor of *Perceptions of Practices*.

Administrator employment. Another aspect of administrator experience examined in this study was the length of time an administrator had been in his/her current position. Administrator experience in current position was measure by five categories: (1) less than 1 year, (2) 1 to 3 years, (3) 4 to 6 years, (4) 7 to 9 years, and (5) 10 or more years. Table 32 provides the means for perceptions of evidence-based decision-making practices based on administrator years of experience. The number of years of experience administrators had been in their current employment positions were fairly evenly split among the five categories. There were 17.5% (n = 47) of the administrators who had been in their current position for 10 or more years, 16.8% (n = 45) in their current position for 7 to 9 years, 22.8% (n = 61) in current position for 4 to 6 years, 29.5% (n = 79) for 1 to 3 years, and 13.4% (n = 36) who were in their first year in their current position. The means and standard deviations for administrators in each of

the different lengths of employment categories on perceptions of evidence-based decision-making practices are displayed in Table 32. The means did not produce statistically significant results and the effect size was very small ($\eta^2 = .010$) for this sample. A review of the data did not reveal any uncommon or unusual outcomes. Based on these results, the number of years an administrator has been in his or her current employment position is not a good predictor of administrators' *Perceptions of Practices* for this sample.

Research question II summary. The purpose of this research question was to investigate the possibility that the three administrator characteristics of level of education, overall administrative experience, and experience in current employment position, could predict administrator perceptions of evidence-based decision-making practices. The analysis of these three administrator characteristics indicated that they were not good predictors of perceptions of evidence-based decision-making practices. The effect sizes were small and only the effect size for administrators' level of education was somewhat noteworthy ($\eta^2 = .025$). However, differences in the means of perceptions of evidence-based decision-making practices between administrators' with a Ph.D. and those with an Ed.D were intriguing. These differences brought about questions concerning the differences in the two programs and if the differences could be a factor in perceptions of evidence-based decision-making practices. These questions suggest the need for further research concerning doctoral programs and preparation for evidence-based practices.

Research question III. To what extent can central-office administrators' school district characteristics, such as type (rural, suburban, and urban), size, geographic location, and presence of evidence-based policies predict perceptions of evidence-based decision-making practices?

The varying characteristics of individual school districts can affect how the district operates as a whole and how administrators conduct business on a daily basis (Abbott, Joireman, & Stroh, 2002). In the state of Texas, school district characteristics may vary widely, as related to type, size, and location. The Texas Education Agency collects data and maintains a directory of district characteristics in which districts throughout the state are categorized and classified. The type of setting, size or number of students enrolled in a district, and the geographical region are characteristics of importance identified by the Texas Education Agency.

The type of setting, such as rural, suburban, or urban, which indicates the type of community in which a district resides, could conceivably impact staff and resources readily available to districts. When considering differences in district sizes, in Texas districts range from the extremely small such as Divide ISD with 13 students to the very large such as Houston ISD with well over 200,000 students. How schools operate and administrators function in each of these districts and all the districts in-between may be very different based on their size of student enrollment. As related to location, the mere size of Texas makes geographical location an indicator of interest as weather and terrain may impact how a district operates. It is plausible to think that any or all of these may affect the way a district operates, conducts its daily business, and how administrators use

evidence. Therefore, district type, size, geographical location, and presence of evidence-based policies were determined to be reasonable district characteristics to investigate as predictors of administrators' perceptions of evidence-based decision-making practices.

The present study sought to determine if the district characteristics of type, size, location, and presence of policy could predict administrators' *Perceptions of Practices*. School district type was measured by three categories, district size was measured by ten categories, and geographic location was measured by five categories. Additionally, information was obtained concerning whether or not the district had policies concerning evidence-based decision-making practices.

School district type. School district type was measured by three categories: rural, suburban, and urban. Table 33 provides the means and standard deviations for administrators' perceptions of evidence-based decision-making by the type of district. The sample in the present study was composed of 68% (n =183) rural districts, 25% (n = 67) suburban districts, and 7% (n = 18) urban districts. The results of the ANOVA analysis indicated that there were statistically significant differences in scores for district types with a moderate effect size (η^2 = .05). A Tukey post hoc test indicated that the differences were from scores of administrators from rural and suburban districts on their perceptions of evidence-based decision-making practices.

Administrators from rural districts had lower means (M = 4.83, SD =.771) on perceptions of evidence-based practices than administrators from suburban districts (M =5.21, SD = .621). Figure 15 provides a plot of the mean scores for all three district types. The differences in means for rural administrators and urban administrators were

not found to be statistically significant, nor were the differences in means for urban and suburban districts found to be statistically significant. However, the confidence interval for urban administrators' mean scores was large as seen in Figure 16. The small sample size for urban districts (n = 18) likely impacted the wide confidence interval, as small samples tend to provide less precision and result in larger confidence intervals.

Rural districts face challenges that their suburban counterparts do not experience. Rural districts are typically small with fewer students and often experience geographical isolation (Reeves & Burt, 2006). Funding, which is typically based on average daily attendance numbers and local property tax values, can cause disparities in the available dollars schools have for training and professional development. As rural districts have much smaller enrollment they also have fewer businesses that support the districts with higher tax revenues. Suburban districts' higher tax bases due to residential and business property values along with more state revenue provided through higher student enrollment equates to more dollars and the ability to combine services and programs to support students and staff. Additionally, fewer available resources, including staff or the money to support them, result in rural school district administrators wearing many hats. In some rural districts the central office administrator is also a principal, teacher, and coach. These challenges experienced by rural districts could result in fewer training opportunities for administrators and fewer opportunities to employ evidence-based practices as a whole.

School district size. The Texas Education Agency categorizes school districts into 10 size categories based on student enrollment. The present study employed the

same size categories as those used by the Texas Education Agency. The 10 school district size categories used for the present study were: (1) under 500; (2) 500 to 999; (3) 1,000 to 1,599; (4) 1,600 to 2,999; (5) 3,000 to 4,999; (6) 5,000 to 9,999; (7) 10,000 to 24,999; (8) 24,000 to 49,999; (9) 50,000 or more; and (10) shared services arrangements (SSA). The means and standard deviations for district size on perceptions of evidence-based decision-making practices are provided in Table 34 and illustrated in Figure 18. The 95% confidence intervals for the means by the district size are provided in Figure 19. Results of the ANOVA analysis indicated there were statistically significant differences in administrators' mean scores based on district size with a moderate effect size ($\eta^2 = .08$). A Tukey post hoc test indicated that there were statistically significant differences between school districts in category 1, with under 500 students ($n = 40$), and districts in category 3, with 1,000 to 1,599 students ($n = 31$), as well as between districts in category 1, under 500 students ($n = 40$) and category 6 with 5,000 to 9,999 students ($n = 35$). However, there were no statistically significant differences between districts in category sizes 3 and 6. An examination of the means and standard deviations in Table 34 indicated that districts in category 1, the smallest districts in Texas, had the lowest scores on perceptions of evidence-based decision-making practice. Further examination of Table 34 along with Figure 19, which displays the 95% confidence intervals suggests that differences may also exist between districts in category 1 and category 7; however, the differences were not detected in the post hoc test, even though the mean was higher (M =5.167) and the standard deviation smaller (SD = .570) than all other district categories.

The analyses indicated that administrators from small districts experienced the lowest scores on *Perceptions of Practices* than any of the other size categories. Because administrators of rural districts also had the lowest means, a crosstabs analysis was conducted to determine the percentage of districts that fit into both categories. A review of the crosstabs in Table 37 indicated that all of the districts with fewer than 500 students were also identified as rural districts.

School district geographical location. To determine if school district's geographical location could predict administrators' perception of evidence-based decision-making practices, the 20 Regional Education Service Centers were grouped into five geographical locations: (1) north, (2) south, (3) east (4) west, and (5) central (see Appendix E). The data were analyzing and there were no statistically significant differences and the effect size was very small ($\eta^2 = .008$). A review of the means, standard deviations, and 95% confidence intervals provided in Table 35 for the scores on perceptions of evidence-based decision-making practices by the administrators in the geographical locations found the means to be consistent across geographic locations, indicating that geographic location was not a good predictor of *Perceptions of Practices* for this sample.

Existence of school district policies. School districts, like most other organizational institutions, create policies that are designed to guide the operation of the organization and influence the behavior of the organization's members (Katz & Kahn, 1978). To determine if the existence of policies concerning evidence-based decision-making could predict administrators' perceptions of their use of evidence-based

decision-making practices, administrators were asked if their districts had policies concerning the use of evidence-based practices. When asked if their district had such policies, administrators could respond (1) yes, (2) no, or (3) I am not sure. There were statistically significant differences based on administrator responses of yes (n =125), no (n = 114), and I am not sure (n =26) on perceptions of evidence-based decision-making practices and a noteworthy effect size (η^2 = .03). Interpretation of the analyses suggested that administrators who identified their districts as having policies concerning evidence-based practices also had higher perceptions of their own evidence-based decision-making practices. There were statistically significant differences between those whose districts had policies (M = 5.068, SD =.776) and those who were not sure (M = 4.679, SD =1.031). Although, the differences were not statistically significant between those who answered yes and those who answered no (M = 4.863, SD = .660), administrators whose districts had policies in place did score higher than those who answered no and those who were not sure. Table 36 and Figures 20 and 21 provide the means, standard deviations, and 95% confidence intervals for administrators' perceptions of evidence-based decision-making practices based on whether or not district policies were in place.

The presence of school district policies concerning evidence-based decision-making practices appears to be a good predictor of perceptions of evidence-based decision-making practices. Administrators who knew their districts had policies scored the highest on *Perceptions of Practices*. This supports previous studies by Coburn, Honig, and Stein (2009) that indicated the need of good policy to be able to build capacity for the use of evidence-based decision-making practices in school districts.

Research question III summary. Research question III investigated the possibility that district characteristics such as, type, size, geographical location, and the presence of district policies could predict administrators' perceptions of their evidence-based decision-making practices. Based on the examination of the data from the present study, small districts were also rural districts and it is plausible to think that the challenges they face as regards funding, staff, and resources could impact their perceptions of evidence-based decision-making practices. The results of the analyses in the present study indicated that type of district and size of district are predictors of perceptions of evidence-based decision-making practices. The data also indicated that the presence of polices did explain variance in administrators perceptions of their evidence-based decision-making practices, making it a predictor of *Perceptions of Practices* as well. However, the data concerning geographical location indicated it was not a good predictor as it did not produce statistically significant results.

A thorough review of the data concerning presence of district policies revealed some interesting results. The data in Table 36 indicates that there were 128 administrators who specified that their districts did have evidence-based policies in place and districts with policies in place had the highest means on evidence-based decision-making practices (M = 5.068, SD = .776). Interestingly, of the 128 administrators who specified their district had policies in place, 66% (n = 85) of those districts were rural districts. Despite the results that rural district administrators' means of perceptions of evidence-based decision-making practices were lower as a whole (M = 4.83, SD =.771), 46% (n = 85) of rural district administrators who specified they had policies in place

accounted for 66% of the higher means for policies on *Perceptions of Practices* (*M* = 5.068, *SD* = .776). This information appears to support having a policy in place as a good predictor of evidence-based practices; however, further research needs to be conducted to fully understand the impact of district policy on perceptions of evidence-based decision-making practices.

Research question IV. At what administrator level are the evidence-based practices decisions made?

As in any organization, the organizational structure of a school district influences the course of daily work and usually determines how decisions are made (Coburn, Honig, & Stein, 2009). Often, decision-making in school districts are made on one of three levels: (1) classroom, (2) campus administration, or (3) central office administrator (Fields & Feinberg, 2001). However, there are also multiple levels of decision-makers within the central office. The literature on evidence use in decision-making has previously focused on teacher decision-making and campus based decisions. Yet, even with the multiple requirements for using evidence when spending federal funds, research on central office administrators evidence-based decision-making continues to be somewhat neglected (Honig & Coburn, 2008). In the present study, administrators were asked about the administrative level in their district where evidence-based decisions were made.

For this sample, the 42.9% (*n* = 115) of evidence-based decisions were made by superintendents, followed by 26.1% (*n* = 70) program directors/budget managers. Table 39 and Figure 22 illustrate the frequencies and comparisons of decision-makers for the

present sample. In rural districts the superintendent was the primary decision-maker, whereas the assistant superintendent or program director was more likely to be the decision-maker in Urban and Suburban districts. Based on the data, smaller rural districts decisions were made at the higher superintendent level. This could be due to the fact that in some small rural districts the superintendent is also the program director/budget manager yet only identified themselves as superintendent in the study. Administrators from suburban districts identified program directors/budget managers as the primary decision-maker concerning evidence-based practices. In urban districts, the majority of decisions were split between the program director and the assistant superintendent. These findings could be important because type of district was a predictor of administrators' *Perceptions of Practices*. How, and at what level decisions are made is a reflection of the districts organizational structure and although the data collected here provides some insight, further investigation concerning the impact of organizational structure of the central office is warranted.

Synthesizing Results and Interesting Findings

Synthesizing results. In synthesizing the results of the present study, it should first be noted that evidence-based decision-making is a complex process requiring administrators to have specific skills to fulfill their obligation to use evidence in their decision-making. These skills may have been overlooked by the entities that originally required the implementation of evidence-based practices (Honig & Coburn, 2008). However, exactly what administrators need to know continues to be a nebulous skillset which could be at the root of the reported symbolic use of evidence in previous research

(Coburn, Honig, & Stein, 2009; Coburn & Talbert, 2006; Coburn, Toure, & Yamashita, 2009; Farley-Ripple, 2008). The many variables that can impact how decisions are made further complicate the ability to determine if evidence-based decision-making practices are being employed. However, the results of the present study clearly indicated that an administrators knowledge of evidence-based decision-making practices and self-confidence in statistical methodology and analysis were good predictors of administrators who perceive themselves to be implementing evidence-based decision-making.

The characteristics of individual administrators did not appear to impact their perceptions of evidence-based decision-making, as they were not identified as predictors of administrators' perceptions for the present sample. However, district characteristics did provide information about evidence-based decision-making practices as the size and type of district were determined to be good predictors of evidence-based decision-making practices. It should also be noted that district type and size appeared to be interrelated as the variables that impacted size also impacted type, as rural districts tended to be small and urban district were large, with suburban district fitting between. The presence of district policies also proved to be a good predictor of evidence-based decision-making practices, especially when considering that the lowest overall means for perceptions of evidence-based decision-making practices were from administrators from rural districts, but the administrators from rural districts who have evidence-based policies in place accounted for 66% of the higher means on *Perceptions of Practice*. And finally, a glimpse of the organizational structure of districts was obtained by looking at

the level in which evidence-based decisions are made in the various types of districts, which implied that smaller districts make decisions at higher levels.

Interesting findings. As the present study investigated the effects of administrator characteristics and school district characteristics on perceptions of evidence-based decision-making there were some interesting findings. Administrator characteristics did not provide any statistically significant results; however, when administrator characteristics data were closely examined, administrators with a Ph.D. who have been traditionally thought to have a more research focused degree program had the highest mean scores (M = 5.417) on *Perceptions of Practices* and smallest standard deviation (SD = .605), as compared to all other administrator degree categories including an Ed.D., which has traditionally been thought to have a more practitioner focused degree program. Another interesting finding in the data was that administrators with less than one year of experience and administrators with more than 10 years of experience had the lowest mean scores on *Perceptions of Practices* when compared to administrators in all of the other experience categories.

Implications for Future Research

Based on findings from the present study about perceptions of evidence-based decision-making practices the present study also revealed information about evidence-based decision-making practices that led to questions needing further research. The following implications for future research were based on information from the present study.

1. Further research should investigate the skills and evidence use of administrators just completing a Master's program, having no practical experience, and administrators with ten or more years of experience who have been out of school for some time.
2. Through the examination of administrators' current perceptions of their evidence-based decision-making and the factors that predict such practices, implications for practice may include training for practitioners to improve their understanding of evidence-based practices and statistical methodology and analysis.
3. Implication for future research might include an investigation of administrators' certification programs to determine the skills and level of evidence-based practices being taught in administrator preparation programs.
4. Further research on the impact of organizational context in small districts as regards evidence-based practices may also be warranted.
5. Based on the aggregation of data by district type, superintendents made the majority of decision in rural districts and directors/budget managers made the majority of the decisions in both urban and suburban districts. These results may imply that further research needs to be conducted to investigate the cause for such differences in central offices based on district size.

Final Thoughts

Although the requirements for evidence-based practices have been in place for more than a decade, central office administrators continue to struggle with implementing the mandates for its use. However, when compared to previous studies, the present study indicates that central office administrators who are employing evidence-based decision-making practices appear to be more knowledgeable about evidence use and they do seem to have confidence in their abilities to understand statistics. The present study also indicates that central office administrators may be changing their beliefs about research and evidence use. Previous studies indicated that many administrators did not trust research and using evidence-based practices was often symbolic rather than true practice. As beliefs and attitudes about evidence-based decision-making practices become more accepting and less skeptical of research, the hopes are that evidence-based decision-making practices will become the norm.

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APPENDIX A

First contact email

March 15, 2013

Dear *Administrator*,

My name is Bonnie Haecker and I am a doctoral student at Texas A&M University conducting research on school district central-office administrators' evidence-based practices. You are being invited to participate in this survey because you meet the criteria for my research of being a school-district administrator who manages a federal budget. **The purpose of my research is to identify factors that influence administrators' use of evidence-based practices when making decision about interventions purchased to improve student achievement**. Your contribution to this study would be greatly appreciated. Should you choose to participate, the **obtained information will aid in improving professional development for administrators concerning evidence-based practices**.

The survey is located online at http://www.esurveyspro.com/Survey.aspx?id=1e70d666-b633-4879-85bd-02a40df3704a . This link will take you directly to the sign in page. The password for this study in ***EBP.*** The survey should take approximately 20 minutes to complete.. **There are no right or wrong answers**, only information that will guide professional development. All data collected in this study will be reported in aggregate. Your answers are anonymous and no individual-identifiable information will be reported.

I know your time is valuable and to show appreciation for your time and contribution to this study, **those who complete the survey may enter a drawing for one of five $50 Visa gift cards**. At the end of the survey you will be directed to another site to enter the drawing. Your contact information will not be connected to your answers nor will it be shared or used to identify you in any way other than as an entrant for the drawing.

The informed consent is online and explains the survey further. Please feel free to contact me if you have any questions. You can reach me by email at bonnie.haecker@gmail.com.

Thank you for your time and contribution to this study,
Bonnie Haecker

APPENDIX B

Follow-up email (sent one week after the original as a reminder)

March 22, 2013

Dear *"NAME"*,

My name is Bonnie Haecker. I am a doctoral student at Texas A&M University conducting research on administrators' use of evidence-based practices. I recently sent you an invitation to complete a survey about evidence-based practices. I know that your job is busy but wanted to send you a reminder with the hopes that you will take a few minutes out of your busy day to contribute to this research.

You have been identified as a participant because as an administrator who manages a federal budget, you meet the criteria for this study. I would truly be grateful if you would agree to participate in my study.

The survey can be found online at http://www.esurveyspro.com/Survey.aspx?id=1e70d666-b633-4879-85bd-02a40df3704a. This link will take you directly to the sign in page. You will be asked to enter a password. The password for this study in ***EBP.***

Because I know your time is valuable and to show my appreciation for your time and contribution to this study once the study is completed you will be directed to another site to enter a drawing for one of five (5) $50 Visa gift cards. Your contact information will not be connected to your answers nor will it be shared or used to identify you in any way other than as an entrant for the drawing.

The informed consent is included in the survey and further explains my research. However, if you have any questions or concerns, please feel free to contact me via email at bonnie.haecker@gmail.com.

Thank you again for your time and contribution to this study,
Bonnie Haecker

APPENDIX C

Individual Informed Consent Form for Administering Survey Instrument

Evidence-Based Decision-Making: Influences on Central-Office Administrators' Decision-Making Practices

As a school district administrator who manages a federal budget, you have been selected to participate in this study. The study is designed to investigate variables that impact central office administrators' use of research evidence when purchasing interventions, programs, and products used to improve student learning . Currently there is little information about how administrators use research evidence in their decision-making practices and this study proposes to obtain information to help guide professional development for administrators concerning evidence-based practices. **There are no right or wrong answers**, only information that will guide professional development. Your answers are anonymous and district's will not have access to individual responses.

This survey will take approximately 20 - 25 minutes to complete.
Once the survey is completed you will be directed to another site to complete your entrance into the gift card drawing.

I understand that:

- **The purpose of the study** is to examine the decision-making practices of Texas school district administrators who currently manage either IDEA or NCLB-Title budgets for their district.
- I understand that my **responses are totally anonymous**. **No individual identifying information** such as, name, address, or social security number will be collected**.**

I further understand that:

- My participation is **strictly voluntary**.
- Texas A&M University researchers will not evaluate or supervise me while I am participating in this study. The information gathered will not affect my job performance, evaluation, or any other aspect of employment or job performance.
- The **information gathered will be anonymous** and no information will be gathered about me. My name and other identifying factors will not appear in reports or any publication of the data or results.

- **I may opt out of the project at any time and for any reason** I deem necessary with no repercussions.

Information about you will be kept confidential to the extent permitted or required by law. People who have access to your information include the Principal Investigator and research study personnel. Representatives of regulatory agencies such as the Office of Human Research Protections (OHRP) and entities such as the Texas A&M University Human Subjects Protection Program may access your records to make sure the study is being run correctly and that information is collected properly. Information about you and related to this study will be kept confidential to the extent permitted or required by law.

This research study has been reviewed and approved by the Institutional Review Board-Human Subjects in Research, Texas A&M University. For questions about your rights as a research participant; or if you have questions, complaints, or concerns about the research, you may call the Texas A&M University Human Subjects Protection Program office at (979) 458-4067 or irb@tamu.edu.

I have read and understand the explanation provided to me. I have had all my questions answered to my satisfaction, and **I voluntarily agree to participate in this study**. I have been given a copy of this consent form.

If you have any questions or concerns, please feel free to contact:
Bonnie Minnia-Haecker
bonniehaecker@gmail.com
Texas A&M University
College Station, TX

◉ I **AGREE** to participate. (Click on the Agree Button and then click on Next to continue with the survey.)

○ I do **NOT AGREE** to participate. (Click on Quit and end the survey.)

APPENDIX D

PART I: INFORMATION ABOUT YOU

1. Which of the following best describes your **current employment position**?
   - ☐ Campus Administrator
   - ☐ State and federal programs director/coordinator
   - ☐ Special education director/coordinator
   - ☐ Assistant Superintendent
   - ☐ Superintendent
   - ☐ Other (Specify)

2. How long have you been in your current position?
   - ☐ Less than 1 year
   - ☐ 1 – 3 years
   - ☐ 4 – 6 years
   - ☐ 7 – 9 years
   - ☐ 10+ years

3. How many **total years of experience** do you have as an administrator?
   - ☐ Less than 1 year
   - ☐ 1 – 3 years
   - ☐ 4 – 6 years
   - ☐ 7 – 9 years
   - ☐ 10+ years

4. What is your highest **completed** degree?
   - ☐ Associate
   - ☐ Bachelor
   - ☐ Master
   - ☐ Ed.D.
   - ☐ Ph.D.

5. What year did you earn your highest degree?

   _____

6. At what college or university did you earn your highest degree?

   _____

7. Are you responsible for managing a budget for your school district?
   ☐ Yes ☐ No

8. What type of budget(s) do you manage? (Check **ALL** that apply).
   ☐ Federal ☐ Local ☐ None

9. Ethnicity (Check **ALL** that apply).
   - ☐ White
   - ☐ African American
   - ☐Latino/Hispanic
   - ☐ Asian
   - ☐ Indian

☐ Other

10. Gender

☐ Male ☐ Female

PART II: INFORMATION ABOUT YOUR DISTRICT

1. In which ESC Region is your district?

(For cooperatives and shared service arrangements check **ALL** that apply).

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

☐ 11 ☐ 12 ☐ 13 ☐14 ☐ 15 ☐ 16 ☐ 17 ☐18 ☐19 ☐ 20

2. How many students are in your district?

☐ Under 500
☐ 500 – 999
☐ 1,000 – 1,599
☐ 1,600 – 2,999
☐ 3,000 – 4,999
☐ 5,000 – 9,999
☐ 10,000 – 24,999
☐ 25,000 – 49,999
☐ 50,000 or more

3. Which of the following best describes your district?

☐ Rural ☐ Suburban ☐ Urban

4. At what level are **final decisions** made concerning the purchases or implementation of new programs or practices?

☐ Campus level
☐ Program directors/budget managers
☐ Research department
☐ Assistant Superintendent
☐ Superintendent

5. Does your district have **policies** or specific **procedures** for determining evidence/research base when purchasing or implementing new programs, practices, or interventions?

☐ Yes ☐ No ☐ I am not sure

PART III: INFORMATION ABOUT YOUR PRACTICES

1. I can **formulate** a clear answerable **question from school data** to guide my decision for interventions.

☐	☐	☐	☐	☐	☐
Strongly Disagree	2	3	4	5	Definitely Agree
Not Like Me At All					**Just Like Me**

2. I know how to **locate research** on programs I want to implement.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

3. I **do not have time** to **read the research** to keep up with all the new evidence.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

4. I **track down research** pertaining to the programs that I supervise.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

5. **Literature and research** are **important** when looking for programs and interventions to improve student learning.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

6. I know **research** is important for **improving student achievement.**

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

7. I feel that **research studies** could be **written in a clearer manner.**

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

8. I know **I am capable of evaluating** the quality of **research.**

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

9. I **share the research evidence** I find **with my colleagues.**

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

10. I can **determine** how **useful a program** would be for my district just **by reading the research**.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

11. I am still **skeptical of research.**

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

12. **Research evidence is important for student achievement.**

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

13. When reading research studies I **can differentiate strong from weak evidence.**

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

14. I **evaluate research** information **to guide my decisions** concerning educational interventions.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

15. **I can identify an effective program** by analyzing the published research.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

16. I **read** the research carefully to make sure the **design is appropriate** and **fits the research** question.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

17. I **critically examine the research** on new programs **before I make my decision.**

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

Not Like Me At All **Just Like Me**

PART IV: INFORMATION ABOUT YOUR SELF-CONFIDENCE IN INTERPRETING RESULTS TYPICALLY FOUND IN PUBLISHED RESEARCH

1. **Identify** the **scale of measurement** for a variable.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

2. **Interpret the probability value (*p*-value)** from a statistical procedure**.**

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

3. **Identify** a **skewed distribution** when given the values of **three measures of central tendency.**

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

4. **Identify** the **factors that influence power**.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

5. **Explain** the **value of the standard deviation** in terms of the variable being measured.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

6. **Interpret** the results of a **statistical procedure** in terms of the research question.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

7. **Differentiate** between **strong and weak evidence** that a program or practice is **successful.**

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

8. **Understand** the numeric value of **what the standard error is measuring**.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

9. **Distinguish between a Type I error and Type II error in hypothesis testing.**

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

10. **Interpret confidence intervals** reported in research studies.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

11. **Know the difference** between a population **parameter** and a **sample** statistic.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

12. **Determine** the appropriateness of the **methodology** used for the **question** being asked.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

13. **Distinguish** between the objectives of **descriptive versus inferential** statistical procedures.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

14. **Know** when **mean, median, and mode** should be used as a measure of central tendency.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

15. **Understand** the difference between a **sampling distribution** and a **population distribution.**

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

16. **Overall confidence** in understanding the results reported in research studies.

☐ ☐ ☐ ☐ ☐ ☐

Strongly Disagree 2 3 4 5 Definitely Agree

No Confidence At All **Completely Confident**

Thank You

Thank you for taking time to respond to these survey questions. To show appreciation for your efforts please complete the information below to be entered into the drawing for one of the $50 Visa gift cards. If you are interested in the results of this study, results will be posted on my website at www.EBDM4Education.com

Please Follow This Link

http://EBDM4Education.com/Home.php

to provide your name and address for entry into the $50 Visa Gift Card Drawing!

Thank you again for contributing to this research project!

Be sure to type the following pass phrase in the comment box of the entry form!

"Evidence Based Practice"

APPENDIX E

Texas State Educational Service Center Regions