The Role of Superintendent Longevity in Predicting 2014-2015 APR Scores for Missouri School Districts

Brian Robert Rudolph
B.A., University of Missouri-Kansas City, 1999
M.S., Southwest Missouri State University, 2002

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_____
James Robins, Ed. D.
Major Advisor

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Tes Mehring, Ph. D.

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Phillip Messner, Ed. D.

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Abstract

Buoyed by the drive to become one of the top 10 education states by 2020, Missouri placed a tremendous focus on student achievement. In Missouri, such achievement was measured using Annual Performance Report (APR) scores. As one of the state's accountability measurements, APR was comprised of five subset scores: academic achievement, subgroup achievement, college and career readiness, attendance rate, and graduation rate. Districts were held responsible by the public and the state for maintaining high levels of achievement. No other individual was held as accountable as the district superintendent. However, research suggested that districts which frequently changed superintendents were unable to sustain the momentum needed to improve (Fullan, 2002). Whether there was a direct correlation between superintendent longevity and student achievement in Missouri schools was unknown prior to this study.

The study focused on the relationship between superintendent longevity and student achievement in Missouri. For purposes of the study, achievement was measured using districts' APR scores (including the five subset scores) from 2014-2015. Superintendent data were drawn from those individuals who had served as superintendent for at least five years in the same district in 2014-2015. Ten research questions guided the study, most of which focused on the correlations between longevity and achievement. Additionally, longevity was placed in context with three other variables (district size, percentage of free and reduced lunch, total district service) to predict student achievement. Correlations were also established between longevity and the three predictor variables.

Significant correlations were found between superintendent longevity and six variables: academic achievement, subgroup achievement, college and career readiness, overall APR scores, free and reduced lunch percentage, and total district service. However, all the correlations were weak and provided little explanation of variability between longevity and achievement. A multiple regression model was formed and demonstrated that two variables were able to significantly predict achievement: free and reduced lunch percentage and superintendent longevity. However, the variability was also weak and offered little practical significance. The study concludes with implications for practitioners and recommendations for future researchers.

Dedication

This dissertation is dedicated to my family, Julie and Janalee Rudolph, who endured countless nights hearing me use the phrase, “I’m going downstairs to work on my paper.” This dissertation is also dedicated to the memory of my father, Bill Rudolph, who taught me that stubbornness, used for the right reasons, is called perseverance.

Acknowledgements

First and foremost, I would like to thank God for His help in completing this journey. It is truly though You that all things are possible. I pray that this task will be used to further Your purpose. Second, I would like to acknowledge the efforts of Dr. James Robins. Dr. Robins took a defeated doctoral student and turned him into a completed doctoral student. Thank you for your encouragement and willingness to help me though (and sometimes drag me through) this endeavor. Third, I would like to thank Dr. Phillip Messner for helping to clarify the statistics for my social studies brain. Without you, this paper would have never got off the ground. Fourth, I would like to thank Dr. Tes Mehring for her willingness to help a desperate doctoral student who was furiously trying to finish something he started nearly a decade ago. I appreciate your desire to help see me complete the task. Fifth, I would like to thank the administration, teachers, and staff of Grandview Consolidated School District No. 4, who continuously asked me about the progress on my paper. Now that this is done, I might finally start getting to all the emails you have sent me over the past eight years. Finally, I would like to thank my fellow doctoral students in cohort five. It has been a long time since we started this quest together, and I'm glad to be standing with you all at the end.

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Chapter One

Introduction

Waters and Marzano (2006) described the importance of the public school district superintendent in achieving district goals. They found a significant correlation between length of superintendent tenure and student achievement. However, the correlation was very weak and explained little variability between the two variables. Despite the importance of superintendent longevity, the length of superintendent tenure in a single district has not appreciably changed in over 40 years. A survey sponsored by the American Association of School Administrators (AASA) demonstrated superintendents stay in a single district an average of 5.5 years (Vogt, 2007). Olson (1995) described the impact that such movement of leadership had on student achievement, due to the invariable shift in focus accompanied by a new superintendent. Fullan (2002) further suggested that the turnover rate of superintendents was so high that it created a culture where sustained improvement was nearly impossible. In fact, Murphy (2009) argued that "it is not possible to see the results of many reforms implemented during the average tenure of a superintendent" (p. 162).

Results matter in education. The public expects, among other things, that all student achievement scores are high (and continue to show growth), that students exit high school prepared for college or a career, and that districts ensure students graduate in four years (Jacobsen & Wilder, 2007; Bushaw & Lopez, 2013). In the state of Missouri, public school districts' results are measured annually according to the Missouri School Improvement Program (MSIP) guidelines. Missouri's Department of Elementary and Secondary Education (DESE) uses MSIP's Annual Performance Reports (APRs) to

ensure district accountability as well as to provide districts with accreditation. APR scores are public knowledge and are often used to compare districts to one another. Therefore, higher APR scores are always the ultimate goal of every district in Missouri.

Whether superintendent longevity correlates with student achievement is a matter of debate. The weak correlation in the Waters and Marzano study led many other researchers to look for relationships between the same variables. The researchers reported mixed results, ranging from highly correlated to not significantly correlated. For example, researchers found significant positive correlations between superintendent longevity and student achievement in Illinois (Libka, 2012) and Indiana (Metcalfe, 2007), while other researchers found no significant correlations in Pennsylvania (Quinn, 2005) and New Jersey (Plotts, 2011). Even when different researchers each found correlations, there was not consensus about the impact of longevity on achievement. For example, Glass and Franceschini (2007) concluded that there was a significant positive correlation between the two variables and that the effect was seen as soon as two years into the new superintendent's tenure. In contrast, other researchers suggested five or six years were necessary to demonstrate a difference in achievement (Hipp, 2002; Simpson, 2013). Based on the disparity of the various findings, the topic warranted further study.

Background

As the singular individual most associated with district leadership, the superintendent sets the tone and direction of a district. Houston (2007) compared superintendents to the conductor of an orchestra, having to ensure all players (staff, students, community, etc.) perform together in perfect harmony. The shift away from district manager to district leader made superintendents "pivotal actors in the algorithm of

school improvement and student success" (Björk & Kowalski, 2005, p. vii). Glass, Björk, and Brunner (2000) suggested the leadership skills required of the modern superintendent were often developed on-the-job rather than in leadership training programs. In fact, Roughton (2007) suggested that in as little as 90 days as superintendent an individual had learned skills not taught in traditional preparation programs. Superintendents continued to develop such skills throughout their early years in the position (Culotta, 2008). Thus, it is reasonable to suggest that those superintendents with more experience in the position should be better equipped to lead their districts toward greater levels of achievement.

Whittle (2005) demonstrated that new superintendents, particularly external candidates, disrupted district progress because they frequently brought with them new ideas and new leadership styles. In urban districts, where reform and improvement were most often needed, the effect was compounded, due to the higher superintendent turnover rate of 2.5 years (Renchler, 1992). Superintendents in these areas were just beginning to have an impact when they left, and a new superintendent (accompanied by new priorities and methods) took over. Considering that a superintendent was "as crucial for determining change within the district as is the principal within the school" such instability in the position was bound to have an impact on student achievement (Fullan, 2002, p.16). In fact, though mobility in the position was accepted, if not expected, frequent turnover prevented superintendents from fostering the culture necessary for change (Grady & Bryant, 1989).

Longevity was needed to establish lasting change in school districts. Researchers found that it took superintendents four to eight years to change the culture of a district

(Fullan, 2001; Fullan, 2007). Other research suggested that for districts most in need of change, it took "almost ten years of planning for goal-driven, data-driven norms to be put in place" (McLaughlin & Talbert, 2003, p. 12). Regardless of the specific number of years necessary for change to occur, the research was very clear that substantial change took considerable time. However, goals left unfulfilled due to superintendent turnover were often forgotten with the installation of a new regime (Bergeson, 2004). New superintendents often had their own goals and initiatives in mind. Thus, any progress made under the previous superintendent was halted. Therefore, comparing student achievement scores under new superintendents to those of established superintendents may not have reflected reality.

Statement of the Problem

The role of the position of district superintendent shifted toward accountability for student achievement, which brought with it "an enormous amount of political pressure" (Peterson & Young, 2004, p. 343) to demonstrate high levels of success. Clark (2001) suggested that such pressure tended to lead superintendents to shorter lengths of tenure. Myers (2010) further suggested that superintendent longevity was accepted both by boards of education and superintendents as a function of the position. Myers (pp. 11) stated that such "reality is discouraging as evidence suggests in the business world that stability accounts for a large measure of the success for major corporations. If stability in the major corporations bring [*sic*] about a certain amount of organizational success, would not the same hold true for the 'school corporations' of the nation?"

The public's expectations for high levels of student achievement were clearly stated by multiple authors (Bali, 2016; Jacobsen, Snyder, & Saultz, 2014). Thus, if

superintendent longevity was positively correlated with student achievement, districts might be more likely to retain individuals in the position for longer durations. The inevitable turmoil accompanying a new superintendent often derailed progress because of the shifting initiatives brought on by new administrations (Reid, 2001). Sustained levels of change were difficult to accomplish when such instability was present at the top of the organization. Thus, the need to evaluate the strength of the relationship between superintendent longevity and student achievement was evident.

Purpose of the Study

There was a lack of research regarding the correlation between superintendent longevity and student achievement in Missouri. This study explored whether or not a relationship existed between the two variables. It is uncertain whether the two phenomena (superintendent longevity and academic achievement) share variability. While studies have been performed using data from other states, research on the relationship between superintendent longevity and Annual Performance Report (APR) scores in Missouri was not available. This study served to fill the gap in the research. In many of the studies, researchers placed longevity with other variables to form a predictive model of student achievement. In each of these studies, longevity was viewed in the context of its relative strength compared to the other variables.

The first purpose of this study was to explore the relationship between superintendent longevity and overall APR scores (Missouri's measurement of student achievement). The second purpose was to explore the relationship between superintendent longevity and the five subset scores of Missouri APR (student achievement, subgroup achievement, college and career readiness, attendance rate, and

graduation rate). The third purpose was to confirm or contrast the findings of other researchers, that superintendent longevity can be included with other variables to predict student achievement. As the current study's research questions address the three purposes listed, they are referenced in Table 1.

Significance of the Study

The job of the superintendent is well-known for its lack of stability (Callahan, 1966). Because they were held responsible for student achievement in their district, many superintendents began being evaluated based on student achievement data (Caruso, 2015). Thus, superintendents were in danger of being dismissed/terminated when scores did not match the public's expectations. Therefore, this study is significant to superintendents, who will want to be aware of a correlation between longevity and student achievement. A second significance pertains to school districts. Because APR was the method by which Missouri accredits districts, failure to achieve an adequate APR could have devastating effects for schools. Thus, this study is significant to school districts as they needed to know every correlate to APR. Third, this study is significant to those organizations who advise boards of education. While individual boards may not directly read the study, organizations that serve to inform multiple school boards about current trends (e. g., the Missouri School Boards Association) are more likely to read it. Thus, it is also important to those groups so they can inform their members about the importance of superintendent longevity in Missouri. Additionally, the study completed recommendations by numerous researchers (Berlau, 2011; Hipp, 2002; Quinn, 2005; Greer, 2011) who suggested further study of the impact of superintendent longevity on

districts. Finally, the study served to add to the knowledge base surrounding superintendent longevity and its relationship to APR scores.

Delimitations

The researcher delimited the study in the following ways.

1. The researcher only included APR and longevity data from the 2014-2015 school year; therefore, generalization to other time periods is unknown.
2. The researcher only included data on Missouri school districts; therefore, generalization to other geographical areas is unknown.
3. The researcher only included K-12 school districts in Missouri, as K-8 districts use different criteria to measure APR.
4. The researcher only included superintendents who had served five or more years in their current position at the end of the 2014-2015 school year.

Assumptions

The researcher operated the study under the following assumptions.

1. The data reported to the state by the school districts were accurate.
2. The data acquired directly from the Missouri Department of Elementary and Secondary Education were complete and accurate.
3. The researcher made no clerical errors importing the data into the electronic statistical software.

Research Questions

A research question is "an extension of the statement of the purpose of the study in that it specifies exactly the questions that the researcher will attempt to answer" (Johnson & Christensen, 2008, p. 78). Lunenburg and Irby (2008) stated the questions

should be "the directional beam of the study" (p. 126). In the present study, the researcher sought to explore the relationship between superintendent longevity and student achievement. Student achievement was measured using the five subset scores of district APR (academic achievement, subgroup achievement, college and career readiness, attendance rate, and graduation rate) as well as overall APR scores. Additionally, the study sought to explore the predictive nature of superintendent longevity (placed in the context of three additional variables: district size, free and reduced lunch percentage, and total district service) on APR scores. To explore the relationship between superintendent longevity and APR subset scores (academic achievement, subgroup achievement, college and career readiness, attendance rate, and graduation rate), the researcher addressed ten research questions.

RQ1. To what extent is there a relationship between superintendent longevity and academic achievement (as reported by APR in 2014-2015)?

RQ2. To what extent is there a relationship between superintendent longevity and subgroup achievement (as reported by APR in 2014-2015)?

RQ3. To what extent is there a relationship between superintendent longevity and college and career readiness (as reported by APR in 2014-2015)?

RQ4. To what extent is there a relationship between superintendent longevity and attendance rate (as reported by APR in 2014-2015)?

RQ5. To what extent is there a relationship between superintendent longevity and graduation rate (as reported by APR in 2014-2015)?

RQ6. To what extent is there a relationship between superintendent longevity and overall APR scores (as reported by APR in 2014-2015)?

RQ7. To what extent is there a relationship between superintendent longevity and district size (as measured by the total number of students enrolled)?

RQ8. To what extent is there a relationship between superintendent longevity and percentage of students receiving free and reduced lunch (as part of the federal program for impoverished students)?

RQ9. To what extent is there a relationship between superintendent longevity and total district service (as measured by the total number of years a superintendent was employed in his or her district in any capacity)?

RQ10. What combination, if any, of independent variables (superintendent longevity, district size, free and reduced lunch percentage, and total district service) best predict overall APR scores?

To aid the reader in the understanding the research questions, the researcher prepared Table 1 to briefly explain the variables posed in the research questions as potential correlates with superintendents. Additionally, Table 1 contains how each research question addressed the three purposes of the study.

Table 1

Research Question Variables' Correlates with Superintendent Longevity

Research question	Purpose addressed	Variable description
RQ1: Academic achievement	2	All students' scores on Missouri Assessment Program (MAP) exams
RQ2: Subgroup achievement	2	MAP scores of students belonging to "subgroups," which indicates a large number of students in a subgroup population (e. g., race/ethnicity, English language learners, free and reduced lunch, etc.)
RQ3: College and career readiness	2	Includes college preparation test scores (e. g., Advanced Placement, International Baccalaureate, Armed Services Vocational Aptitude Battery, Technical Skills Attainment, etc.)
RQ4: Attendance rate	2	Percentage of time students are in attendance at school
RQ5: Graduation rate	2	Percentage of students who graduate within four years of entering high school
RQ6: Overall APR	1	Sum of the five APR subset scores
RQ7: District size	3	Total number of students enrolled in the district
RQ8: Free and reduced lunch	3	Percentage of students receiving free or reduced lunch price
RQ9: Total district service	3	Total number of years superintendent has been employed in the district in any capacity
RQ10: Multiple variables	3	Superintendent longevity, district size, percentage of students receiving free or reduced lunch, total district service

Note: Research questions have been abbreviated for this table.

Definition of Terms

The researcher used the following operational definitions in this study.

Academic achievement. Academic achievement is one of the five APR standards under MSIP5. It refers to a numerical value of the district's "assessments required by the Missouri Assessment Program (MAP) to measure academic achievement" (Missouri Department of Elementary and Secondary Education, 2015, p. 13).

Annual Performance Report (APR). APR is the state of Missouri's annual "report that reflects MSIP 5 Performance Standards results for districts and buildings used for planning and state accountability determinations" (Missouri Department of Elementary and Secondary Education, 2012, p. 3).

Attendance rate. Attendance rate is one of the five APR standards under MSIP5. It refers to "the percent of students who regularly attend school" (Missouri Department of Elementary and Secondary Education, 2015, p. 48).

College and career readiness. College and career readiness (CCR) is one of the five APR standards under MSIP5. It is a measurement of how well "the district provides adequate post-secondary preparation for all students" (Missouri Department of Elementary and Secondary Education, 2015, p. 35). The calculation of CCR includes Advanced Placement (AP) scores, International Baccalaureate (IB) scores, Armed Services Vocational Aptitude Battery (ASVAB) scores, and dual college credit grades.

District size. Also known as K-12 enrollment, district size was defined as the "head count taken the last Wednesday of September of all resident and non-resident students in grades PK through 12 enrolled in the attendance center. Each student (part-time, full-time or kindergarten) should be counted as one" (Missouri Department of Elementary and Secondary Education, 2015, p. 57).

Free and reduced lunch percentage. Free and reduced lunch percentage was the total percentage of students qualifying for the federal free and reduced lunch program, which indicated that "their household falls within the limits of the federal income chart" (Missouri Department of Elementary and Secondary Education, 2012, p. 107).

Graduation rate. Graduation rate was one of the five APR standards under MSIP5. It referred to "the percent of students who complete an educational program that meets the graduation requirements as established by the board" (Missouri Department of Elementary and Secondary Education, 2015, p. 53).

Missouri School Improvement Program (MSIP). Currently in its fifth version, MSIP (i. e., MSIP 5) was the "system of accountability used by the State of Missouri that holds districts accountable for student achievement" (Missouri Department of Elementary and Secondary Education, 2012, p. 5).

Subgroup achievement. Subgroup achievement was one of the five APR standards under MSIP5. It referred to the *academic achievement* scores of students belonging to identified subgroups, "including free and reduced price lunch, racial/ethnic background, English language learners, and students with disabilities" (Missouri Department of Elementary and Secondary Education, 2015, p. 25).

Super subgroup. School districts were held accountable for student achievement data for up to nine super subgroups: "Asian/Pacific Islander, black, Hispanic, American Indian, white, multi-racial, students with disabilities, English language learners, and low income students" (Missouri Department of Elementary and Secondary Education, 2015, p. 106). A district that had 30 or more students in a specific subgroup reported those data separately from the overall achievement data.

Superintendent longevity. For the current study, superintendent longevity was defined as the length of tenure an individual served in his or her current specific position for consecutive years. For example, a superintendent's longevity was only defined for the length of time he or she was superintendent of that specific district and included neither previous experience in other district roles (e. g., assistant superintendent, principal, etc.) nor experience in other districts.

Superintendent. A superintendent was defined as the "district's chief administrative officer" (Missouri Department of Elementary and Secondary Education, 2013, p. 1). A superintendent was responsible for the oversight of the entire district and was subordinate only to the local board of education.

Total district service. Total district service was defined as the "number of years administrative/supervisory personnel named has been employed in district including the current year" (Missouri Department of Elementary and Secondary Education, 2015, p. 34).

Organization of the Study

The current study is divided into five chapters. Chapter one included an introduction to the study, background, problem statement, purpose statement, significance, delimitations, assumptions, research questions, and a definition of terms. Chapter two contains a review of the related literature, including the historical development and current state of the superintendency, superintendent longevity, APR subset measurements, and the superintendent's impact on APR. Chapter three contains a description of the study's methodology. It includes the research design, population definition, data collection procedures, data analysis and hypothesis testing, and

limitations. Chapter four contains the results of the study, including descriptive statistics, hypothesis testing, and additional analyses. Chapter five contains an interpretation of the results and makes recommendations, including a summary of the study, an overview of the problem, a restatement of the purpose and research questions, review of the methodology, major findings, findings related to the literature, conclusions, implications for action, and recommendations for future research.

Chapter Two

Review of Related Literature

This chapter contains the rationale for studying the relationship between superintendent longevity and student achievement. Superintendent longevity has been an issue for nearly two centuries. Researchers have addressed longevity as a correlate to student achievement in numerous studies (Libka, 2012; Metcalfe, 2007; Sorgi, 2006; Simpson, 2013). The current study sought to establish a relationship between superintendent longevity and the Missouri measure of student achievement, the Annual Performance Report (APR). To place the strength of the relationship between longevity and achievement in context, the relationship of three additional variables to student achievement were included in this chapter: the percentage of students receiving free or reduced lunch price, the number of students enrolled in the district, and the number of years a superintendent was employed in a district.

In an era of increased accountability, school districts focused on continuous improvement. The superintendent was usually the person held most responsible for the success of students. A lack of demonstrable achievement often led to a negative relationship between the superintendent and the board of education (Price, 2014). A poor relationship with the board, in turn, often led to the superintendent's departure (Hackett, 2015). The following chapter contains a review of the extant literature surrounding the study's two variables. The chapter is organized into four sections: the nature of the superintendent position, superintendent longevity, student achievement in Missouri, and the superintendent's impact on APR.

Nature of the Superintendent Position

The superintendency evolved considerably over its first 180 years. Callahan (1966) described the development of the superintendent position from its creation in Buffalo, NY in 1837 to its modern incarnation. However, for nearly two centuries of development, the longevity of superintendents was consistently an issue. Yee and Cuban (1996) demonstrated that longevity declined in very large school districts from an average of almost 15 years in the mid-20th Century to 5.76 years by 1990. However, their research only looked at superintendents in the 30 largest urban districts in the United States and could not be generalized to superintendents nationally. Research since the Yee and Cuban study (Glass, Björk, & Brunner, 2000; McCord, Stream, Ellerson, & Finnan, 2013; Finnan, McCord, Stream, Petersen, & Ellerson, 2015; Finnan & McCord, 2016) demonstrated that longevity overall had moderated. In a national study of superintendents (n = 1250), Glass, Björk, and Brunner (2000) found that longevity vacillated between five and six years. However, their method of calculating longevity deviated from the traditional definition of the number of years served in a single district. Their research analyzed the data "by dividing the total number of years in the superintendency by the number of superintendencies held" (p. v). In their data collection, Glass, et al., did not attempt to discover the exact figure, because a majority of the superintendents were in the midst of their first three-year contract. Inclusion of such data would have changed the average to a lower number of years, "creating the impression the superintendency (was) more transient than it actually is" (p. 42). In fact, researchers (McCord, Stream, Ellerson, & Finnan, 2013; Finnan, McCord, Stream, Petersen, & Ellerson, 2014; Finnan & McCord, 2015) found that the percentage of superintendents

with less than five years of longevity decreased and the percentage with more than five years increased from 2013-2015 (Figure 1). Thus, superintendent longevity seemed to have moderated by 2015.

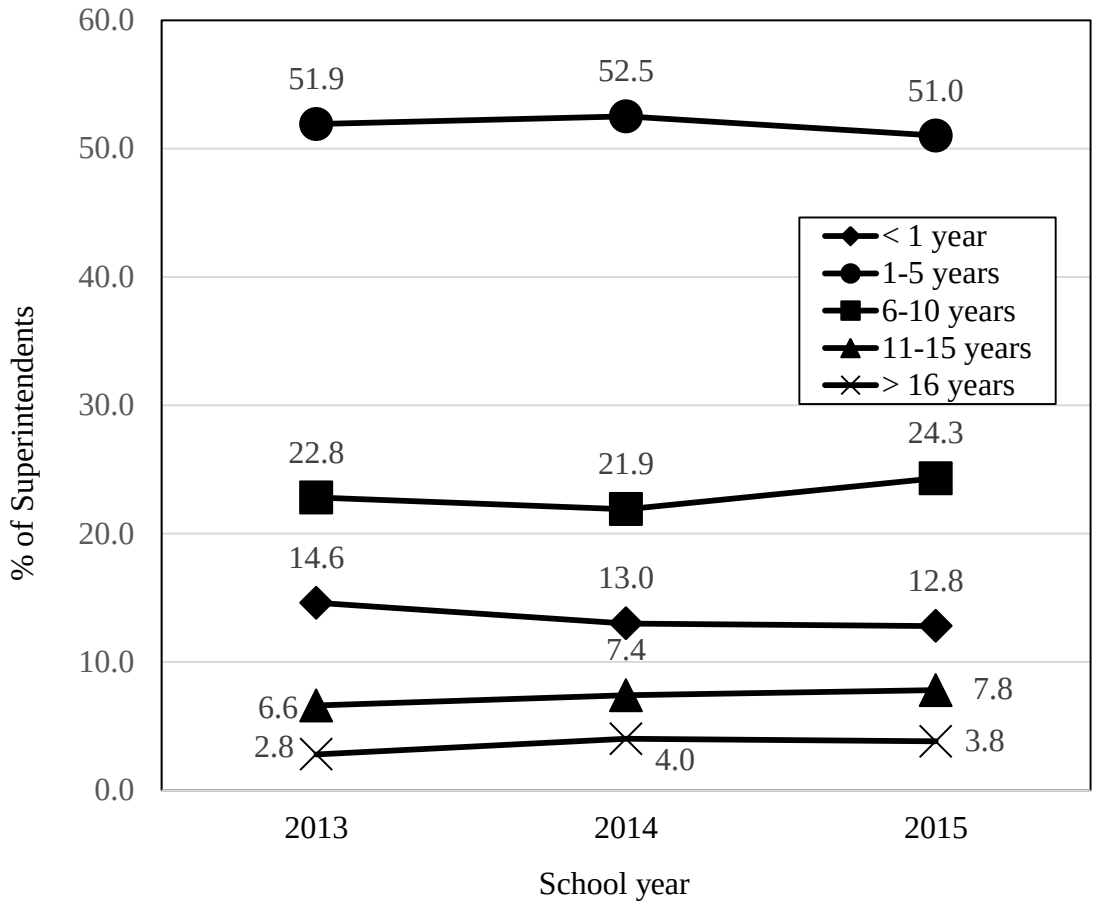

Figure 1. Percentage of Superintendents by Longevity Group Demonstrating Overall Moderation of Length of Tenure, 2013-2015.

History of Superintendent Longevity

In his seminal report on the history of the superintendency, Callahan (1966) described the nature of the profession during its inaugural stages as being reflective of the United States' infancy. Elected boards of education created the district superintendent position as one of an executive who simply followed the board's directives. A superintendent who did not perform to expectations was "liable to lose his livelihood if

he goes wrong" (Callahan, 1966, p. 310). In other words, superintendents who failed to perform to expectations would be dismissed (Kowalski, Petersen, & Fusarelli, 2007). Gore (2016) found that a majority of boards of education considered student achievement data in their evaluation of the superintendent. Such findings surprised many superintendents as they "are far less likely than board members to think that boards evaluate superintendent performance based on student achievement outcomes" (Hess & Meeks, 2010, p. 14). Callahan further decried the lack of longevity by suggesting that it would potentially impact student achievement. He also suggested that the overt connotations of superintendents losing their jobs for failing to meet board expectations "started or strengthened an idea that unfortunately has become a part of our heritage in public education" (Callahan, 1966, p. 22). Thus, it seemed that from its very inception, the superintendent's position within a district was designed to be one of mobility rather than one of stability. However, Callahan did not cite any statistics on superintendent longevity in his discursive history of the superintendency.

Statistics on superintendent longevity were not easily obtained until the 20th Century. However, researchers found that longevity had been an issue for many years (National Education Association, 1890; Mowry, 1895; Callahan, 1962). Winship (1893) further found that superintendents often left (or were dismissed) before their efforts toward improving achievement had been realized. Superintendent longevity had seemingly stabilized by World War II. Yee and Cuban (1996) estimated the average longevity of the superintendents in the largest 25 districts in the United States in 1940 to be 14.72 years. However, such stability would be short-lived, as the superintendent's position "never appeared more expendable than at this mid-century" (AASA, 1952, p.

62). By the 1969-1970 school year, AASA reported that average superintendent longevity had fallen to 6.4 years (Knezevich, 1971). The lack of longevity was almost a running joke, with some suggesting that superintendents should "write their business cards out in pencil" (Keough, 1978, p. 335).

Despite the rapid loss of longevity among superintendents, the length of tenure remained relatively stable for over four decades. In their ten-year studies of the superintendency, AASA reported tenure rates of 6.4 years (Knezevich, 1971), 5.6 years (Cunningham & Hentges, 1982), 6.4 years (Glass, 1992), and 5-6 years (Glass, Björk, & Brunner, 2000). Longevity had remained unchanged for so long that AASA decided not to print longevity statistics in its 2010 study (Kowalski, McCord, Peterson, Young, & Ellerson, 2011).

Current State of Superintendent Longevity

Many dissertations and journal articles addressed the problem of superintendent longevity. The conventional wisdom was that the average length of tenure for a district superintendent was two to three years. However, researchers found such claims to be different from the extant research. In 2000, the American Association of School Administrators (AASA) sponsored surveys involving the length of superintendent longevity. In the first study of 1,250 superintendents, AASA researchers estimated the actual average was between five and six years (Glass, Björk, & Brunner, 2000). The researchers based their estimate on the fact that the superintendents reported holding an average number of fewer than two superintendencies over a nine-year time span. The second study sponsored by AASA found the average length of superintendent service to be 7.25 years (n = 2,499); the same superintendents reported an average of 6.43 in their

previous superintendency (Cooper, Fusarelli, & Carella, 2000). Cooper et al., reported that longevity rates tended to roughly mirror the amount of time those superintendents had spent in their previous position. This finding indicated one of two possibilities. The first possibility was that the superintendent position simply did not lend itself to longevity. The other possibility was that individuals who entered the field were personally mobile. Regardless of which option was correct, the research suggested that superintendents in both studies demonstrated a much greater level of longevity than found in popular opinion.

Glass, Björk, and Brunner (2000) indicated that outliers influenced the superintendent longevity number. They found that 23.9% of superintendents had remained in their position for over 14 years. These findings were in contrast to a large number of urban and rural superintendents who served much shorter tenures. Byrd, Drews, and Johnson (2006) reported urban superintendents served an average of 2.75 to 4 years. This was in contrast to rural superintendents, 61% of whom had been in their districts for five years or less (Hays, 2009). Thus, it seemed that overall longevity rates might have been adversely impacted by the much shorter tenures of small and urban district superintendents.

Relationship Between Superintendent Longevity and Student Achievement

The issue of the impact of superintendent longevity on student achievement did not become a major focus of researchers until after Waters and Marzano's 2006 study. In their research, Waters and Marzano found that longevity significantly correlated with student achievement ($r = .19$, $p < .05$). However, the correlation was thought by some to be of little practical significance, due to the low correlation coefficient. In fact, the

coefficient of determination only accounted for 3.6% of the variance (r^2 = .036), thus leaving 96.4% of student achievement unexplained by superintendent longevity. Other authors were highly critical of their meta-analysis methods, as the individual studies that formed the basis for the meta-analyses were performed by the same research team that performed the meta-analyses (O'Brien, 2015). Additionally, serious questions about the validity and reliability of student achievement measurements were raised, as Waters and Marzano did not give a full description of the various studies used in the meta-analyses (Becker, 2009). The next decade brought additional research which attempted to verify the Waters and Marzano findings regarding the relationship between superintendent longevity and student achievement.

Libka (2012) examined the correlation between superintendent longevity and student achievement in a study of Illinois public schools. The research focused on ACT (formerly called the American College Testing) Reading and Math scores from 2001-2010, which are considered indicative of student achievement in Illinois. Libka was able to establish a significant relationship between the variables over the collective ten-year timespan (r = .13, α = .01) as well as most individual years. The statistical significance was clear, though the practical significance was in question. The mean correlation of .13 only accounted for 1.7% of the variance, thus limiting the impact of the finding. However, an important discovery occurred when Libka compared scores over the ten-year timespan of districts whose superintendents had served for seven or more years to those whose had served less than seven years. In each year, the differences between the two groups were distinct. Overall, the mean score difference for reading was .379 points, and the mean score difference for math was .443 points. The findings in Libka's study

provided additional weak evidence of the correlation between superintendent longevity and student achievement.

Metcalfe (2007) performed research that focused on the same relationship in Indiana public schools. The researcher used the Indiana Statewide Testing for Educational Progress Plus (ISTEP+) as the measurement of student achievement. An analysis of covariance was conducted to determine a statistically significant difference between longevity on student achievement, controlling for other variables (e. g., size of the district, socioeconomic status, parents' education level, etc.). Metcalfe determined that there was a highly significant impact of superintendent longevity on student achievement [$F(8, 444) = 4.73$, $p < .0001$]. The findings indicated strong evidence of a highly significant relationship between longevity and achievement.

Sorgi's (2006) study focused on the relationship between superintendent longevity and student achievement in large urban districts across the United States. Though Sorgi failed to establish a significant correlation between the variables, the researcher found a significant correlation between the number of superintendents over a ten-year period and reading scores ($r = -.36$, $p < .05$). The research of Sorgi indicated a significant correlation between the number of superintendents over a ten-year period and math scores ($r = -.36$, $p < .05$). In both the reading and math findings, the correlations were negative because scores increased as the number of superintendents decreased. Sorgi was effectively able to accept the hypothesis that tenure (i. e., longevity) significantly and positively correlated with student achievement. While the Sorgi findings explained greater variability than that of the Marzano and Waters (2006) study, only 13% of student achievement was explained by the number of superintendents over

the ten-year timeframe. Additionally, the sample included only superintendents in large urban districts. Thus, the generalizability to other populations was unknown.

In a study of rural Kentucky schools, Simpson (2013) was unable to establish a direct correlation between the longevity and achievement ($r[44] = .02$, $p > .05$). However, two of the study's results were promising. The first promising result came from the attempt by Simpson to establish a correlation between superintendent longevity and student achievement growth. In testing a hypothesis, Simpson found there was a significant relationship between the two variables ($r[44] = .75$, $p < .01$). Simpson's finding suggested that over 56% of the variance was explained by superintendent longevity. The second promising result came from the exploration of the difference in student achievement data between districts whose superintendents had served less than five years and those whose superintendents had served more than five years. An independent samples *t*-test demonstrated a significant difference between the two groups ($t[43] = 2.01$, $p < .01$). Thus, their findings further established a link between longevity and achievement. Simpson concluded that there was a correlation between the two variables, and that "the length of years a superintendent leads a school district influences student achievement" (p. 21). However, the sample size, while adequate, was fairly small and may have impacted the results.

Natkin, Cooper, Alborano, Padilla, and Ghosh (2002) reviewed data from a study of 468 school districts nationally. Their research resulted in four main findings. First, the median tenure among the superintendents was approximately 6.5 years. They reported median tenure rather than mean tenure "because means (or averages) can be distorted by the few extreme tenures of 20 or 25 years still sometimes found among

superintendents" (p. 29). The authors discovered that the median for the sample could still increase with time, as many of the superintendents were still employed at the time of the study. Second, the authors found that longevity had not appreciably changed over the previous 20 years. Though the median decreased from 7.5 years to 6.5 years during that time, the difference was not significant ($p = .586$). Third, the authors reported that district size did not impact superintendent longevity. However, they cautioned that their data did not include many of the largest districts in the nation. Finally, the authors found that longevity was not impacted by district location. They found that "rural, small town, suburban and urban settings all showed approximately the same turnover patterns" (p. 30).

Natkin, Cooper, Alborano, Padilla, and Ghosh (2003) used the data from their 2002 research in another study designed to predict superintendent turnover. In their 2003 study, the authors found five factors that helped to significantly predict longevity: micromanagement of the school district by the board of education ($p < .005$), inability to secure funding for new or improved facilities ($p < .001$), merging of school districts ($p < .015$), high levels of poverty in the district ($p < .010$), and superintendents' postgraduate education ($p < .006$). The authors' findings were not without controversy, as they employed censoring of the data to eliminate sampling bias. Censoring amounted to removing a large number of participants from the final data. They followed the recommendation of Yee and Cuban (1996), who recommended censoring on the basis that it unfairly shifts the data toward a higher longevity. Natkin, et al. (2003) suggested that the censored data would have skewed the numbers toward a higher median longevity,

due to their exceptionally long tenure rates. Thus, without censoring, Natkin, et al. suggested the validity and reliability of the findings could have been uncertain.

Maritz (2006) used Adequate Yearly Progress (AYP) under No Child Left Behind (2002) to measure the relationship between superintendent longevity and student achievement in Pennsylvania. Using correlation analysis, Maritz determined that no significant correlation existed between the two variables. However, the researcher found that "although the mean score difference is not substantial, the findings indicate that districts demonstrating AYP statistically, on average, have longer serving school district superintendents" (p. 106). Thus, the results supported the research of others who found a link between superintendent longevity and student achievement. Though statistical significance in the Maritz study was not established, there seemed to be some degree of practical significance: districts with longer-serving superintendents tended to have higher student achievement levels.

Some of the findings of the Maritz study contradicted those of Quinn (2005), while other findings supported his research. Like Maritz, Quinn also researched the link between superintendent longevity and student achievement. Similar to the findings of Maritz, Quinn found no significant correlation between the two variables. However, unlike nearly all of the previous studies about the relationship between longevity and achievement, Quinn used student achievement (in concert with other variables) to predict superintendent longevity. The researcher used a multiple regression analysis that included other factors, including the socioeconomic status of the district (as measured by the percentage of students receiving free and reduced lunch prices) and the size of the school district, to predict superintendent longevity. Quinn's findings would have been

more valuable to the current study. However, he did not report the statistics required by the American Psychological Association's (APA) *Publication Manual* (2009) for multiple regression. For example, while Quinn reported *t*-test and *p*-values, other essential statistics such as the multiple coefficients of determination (i. e., R^2) were not reported. As the APA described reporting standards for most major statistical analyses, the research was left up to interpretation. Thus, the study's results were questionable.

Predicting Student Achievement

Research indicated that other factors in addition to superintendent longevity were predictive of student achievement. Many of the factors included in the research were beyond the control of the superintendent. However, such factors often helped explain some of the variance in student achievement scores.

Myers (2010) explored the predictive nature of multiple variables (e. g., poverty, district size, overall years as superintendent, and superintendent longevity) on student achievement in Kansas schools. Myers found 9.9% of the variance in student achievement scores was explained by the four predictor variables ($R^2 = .099$, $F(4, 294) = 7.980$, $p = .000$). However, superintendent longevity had the least impact of the four variables, though Myers determined it to have a significant impact [$\beta = .138$, $t(2.005)$, $p = .046$]. The model's other three variables had greater impact on student achievement: district size [$\beta = .201$, $t(-3.595)$, $p = .000$], percentage of students eligible for free and reduced lunch [$\beta = .191$, $t(-3.426)$, $p = .001$], and total years as superintendent [$\beta = .167$, $t(-2.429)$, $p = .016$]. As previous researchers had done, Myers was able to establish "that aspects of the superintendency do play a part in student academic achievement, specifically the length of tenure of the superintendent" (p. 67). However, Myers used

data from all districts in the state of Kansas, including those with superintendents who had served short tenures. Such short tenures may not have allowed for meaningful change to occur, thus skewing the results (Fullan, 2007).

Plotts (2011) also attempted to predict student achievement using seven variables in addition to superintendent longevity: district size, the percentage of students eligible for free lunch, the percentage of students eligible for reduced lunch, limited English proficiency students, student attendance percentage, New Jersey educational experience, and total educational experience. Unlike Myers, Plotts did not find that in-district superintendent longevity significantly predicted student achievement [$\beta = .036$, $F(1, 135) = 6.040$, $p = .702$]. The only variables that were predictors of achievement were the percentage of students eligible for free lunch [$\beta = -.348$, $t(-3.372)$, $p = .000$], experience in New Jersey public schools [$\beta = .315$, $t(2.386)$, $p = .018$], and student attendance rate [$\beta = .199$, $t(2.525)$, $p = .013$]. These three variables led to a model that explained 29.9% of the variance in student achievement ($R^2 = .299$, $F(8, 133) = 7.074$, $p = .000$). Variables found to be predictive of student achievement in the Myers study were not significant in the Plotts study: district size [$\beta = .030$, $F(1, 140) = 6.402$, $p = .731$] and the percentage of students eligible for reduced lunch [$\beta = -.011$, $F(1, 138) = .211$, $p = .889$].

Jacobs (2010) analyzed 95 Texas school districts with superintendents in the first three years of their position. Jacobs reported two findings that were pertinent to the current research problem. The first finding was that there was a statistically significant increase in test scores during the superintendent's length of service. The second finding was that the increase in test scores was reduced by district size. Jacobs found that the largest districts increased test scores the least during the study. However, Jacobs also

pointed out that the smallest districts tended to have the lowest overall scores for the duration of the study, despite their improvements. The effect size was highly significant for each of the five categories based on district size (η^2 = .72-.98). This finding indicated that a significant portion of student achievement variance was explained by district size. Despite these findings, Jacobs was unable to find a direct correlation between superintendent tenure and student achievement.

Superintendent Longevity in Missouri

The available research only indirectly included longevity as having an impact on student achievement. For example, Mansfield (2005) looked at the causes of superintendent turnover in rural Missouri school districts. However, he did not include lack of student achievement as one of the primary reasons. Other researchers (Newell, 1997; Patillo, 2008) did not include student achievement as one of the factors impacting superintendent longevity. At the time of the present study, limited research was available that directly explored the relationship between longevity and student achievement in the state.

Most of the research that was available focused on the two very large, urban school districts in the state: Kansas City and St. Louis. For the period from 1980-2015 both of the districts infamously had exceptionally low tenure rates (Yee & Cuban, 1996; Waters & Marzano, 2006). In fact, the Kansas City school district was regarded as the least stable superintendent position in the nation, with an average longevity of 1.4 years (Whittle, 2005). Such data ingrained the notion into the minds of educators and the that the superintendency was not a job where stability should be expected. Thus, the

inevitable media coverage of the hiring and firing of superintendents in these two districts altered the discussion about the reality of superintendent longevity.

Student Achievement in Missouri

The criticism of public schools in *A Nation at Risk* (Gardner et al., 1983) highlighted the need for improvement in public schools. The call for improvement eventually led states to create programs which held schools accountable for meeting specific standards. Missouri addressed this call for accountability by creating the Missouri School Improvement Program (MSIP). Formally adopted by the state Board of Education in 1990, MSIP sought "to promote continuous improvement in the public schools in the state" (Missouri Department of Elementary and Secondary Education, 2016, p. 2). The state was in its 5th cycle of the program at the time of the current study; thus, the current program was referred to as MSIP5.

The fifth cycle of MSIP (MSIP5) was developed from an edict from the Missouri Department of Elementary and Secondary Education (DESE) to continue to improve academic standards across the state. The direction of the standards in MSIP moved from an achievement mindset to a growth model. As DESE began to revise the standards, they did so with four goals of the Missouri School Improvement Program in mind (Missouri Department of Elementary and Secondary Education, 2011).

1. Promote continuous improvement and innovation in all districts.
2. Increase expectations for student achievement and ensure all students graduate college or career ready.
3. Provide support to low-performing districts and provide recognition for high-performing districts.

4. Engage all stakeholders in the improvement process by being transparent about student performance. (p. 1)

MSIP5 signaled a significant shift in how a district was evaluated compared to the 4th cycle (MSIP4). First, districts would be evaluated annually, rather than every five years. DESE made this decision so that schools could review data more frequently, and so the state can provide "earlier intervention in struggling schools" (Missouri Department of Elementary and Secondary Education, 2011, p. 1). However, a district would not be subjected to annual on-site reviews, unless the district was a poor performing district. Second, MSIP5 reduced the number of years that the state reviewed district data. Under the fourth cycle of MSIP (MSIP4), the average of the previous five years of data was used by the state for accreditation purposes; under MSIP5, district data would be averaged over a three-year period. Finally, DESE abandoned the Met/Not Met classification of MSIP4. The state replaced it with a system where districts received a percentage of the total number of Annual Performance Report (APR) points possible. As in previous iterations of MSIP, APR scores were used to accredit districts in the 5th cycle. Additionally, it was the method used by the state for school accountability. Because of the shift in APR from the Met/Not Met categories to a continuous measurement, the current study was able to use the variable as a ratio scale rather than a nominal scale (Johnson & Christensen, 2008).

Annual Performance Report

In the wake of legislation such as No Child Left Behind (2002), accountability for student achievement became paramount. In Missouri, such accountability was measured by a district's Annual Performance Report (APR). Districts earned points for each APR

indicator based on performance. The state placed a premium on certain standards by not weighting each indicator within a standard equally (Missouri Department of Elementary and Secondary Education, 2012, p. 4). The following is a summary of each of the standards and indicators included in APR calculation under MSIP5.

Academic achievement. The academic achievement standard focused on student performance on MAP assessments. The Missouri Assessment Program (MAP) was "the statewide student assessment program developed in response to adoption of the Outstanding Schools Act in 1993" (Missouri Department of Elementary and Secondary Education, 2015, p. 108). Students were required to take either grade-level MAP tests or an end-of-course (EOC) exam at various grade levels in four subjects: English Language Arts (ELA), Mathematics, Science, and Social Studies. Specific grades and the corresponding MAP test given are located in Table 2. For each test, students were given a score based on their individual performance on that test.

Table 2

Required MAP Assessments by Grade Level

Subject	Elementary School	Middle School	High School
English Language Arts	MAP-3rd, 4th, 5th	MAP-6th, 7th, 8th	EOC-English II
Mathematics	MAP-3rd, 4th, 5th	MAP-6th, 7th, 8th*, EOC-Algebra I*	EOC-Algebra I*, Algebra II
Science	MAP-5th	MAP-8th	EOC-Biology
Social Studies			EOC-US Government

Note: *Districts had the option of testing 8th-grade students in using the Algebra I EOC or the 8th grade MAP test. Adapted from *Comprehensive guide to the Missouri School Program*, (p. 18) by Missouri Department of Elementary and Secondary Education, 2014. Retrieved March 28, 2016, from http://dese.mo.gov/sites/default/files/MSIP-5-comprehensive-guide.pdf

Subgroup achievement. The passage of No Child Left Behind (NCLB, 2002) caused states and districts to place a focus on providing an equal educational experience to traditionally low-achieving groups (e. g., racial and ethnic minorities, English language learners, and special education students). Such emphasis was placed on subgroups because the punitive nature of NCLB forced districts to attend to the needs of subgroups more than they had traditionally done (Rhodes, 2012). Dee and Jacob (2010) suggested that the emphasis was working for many subgroups, as they were gaining more than their non-disadvantaged counterparts. Hesitant to see such gains halted, Missouri included subgroup achievement in MSIP5 APR calculations.

The state recognized five subgroups that traditionally performed below average on standardized assessments: Black/African-American, Hispanic, English language learners (ELL), students with an Individualized Education Program (IEP), and students receiving free or reduced lunch prices (FRL). The state deemed these five "super subgroups" (Missouri Department of Elementary and Secondary Education, 2014, p. 21). These five super subgroups formed the basis for a district's accountability under MSIP5. However, a district had to average 30 or more students in a given super subgroup to include that subgroup in the district's APR. Additionally, a student who belonged to multiple subgroups (e. g., IEP and FRL) was only counted once.

College and career readiness. The focus on college and career readiness (CCR) became a focus of educators as a result of *A Nation at Risk* (Gardner et al., 1983), strengthened as a result of NCLB, and reached its zenith during the Obama administration's backing of the Common Core State Standards. As CCR was becoming the "new 'north star' for educations systems" (Council of Chief State School Officers,

2013, p. 3), DESE decided to include it in the calculations for APR in MSIP5. To ensure districts knew the purpose of CCR, DESE (n.d.) created the following definition.

> College and career readiness means that a high school graduate has the necessary English and mathematics knowledge and skills—including, but not limited to, reading writing, communications, teamwork, critical thinking and problem solving—either to qualify for and succeed in entry-level, credit-bearing two- or four-year college courses without the need for remedial coursework, or in workforce training programs for his/her chosen career that offer competitive, livable salaries above the poverty line, offer opportunities for career advancement, and are in a growing or sustainable industry. (para. 1)

The state recognized the need to include multiple measures of "readiness" into its calculations (Camara, 2013). Thus, the state created three CCR measurements with a total of six separate indicators embedded in them.

CCR indicators 1-3 (CCR*1-3) revolved around students' performance on four standardized tests: ACT, SAT, ACT Compass, and Armed Services Vocational Aptitude Battery (ASVAB). CCR*1-3 provided points based on how individual students scored on one of the four tests. CCR indicator 4 (CCR*4) revolved around students' performance in five post-secondary preparation programs: Advanced Placement (AP) exams, International Baccalaureate (IB) exams, Industry Recognized Credential (IRC) exams, Project Lead the Way (PLTW) exams, and dual credit/dual enrollment. Students who received a qualifying score on an AP, IB, IRC, or PLTW exam or received college credit while in high school earned CCR*4 points. CCR indicator 5-6 (CCR*5-6) revolved around students' post-secondary activities. Any graduate who enlisted in the

military, received post-secondary education/training, or was working within 180 days of graduation was counted toward CCR*5-6.

Attendance rate. The relationship between student attendance and student achievement was clear (McBride, 2009). For example, Roby (2004) reported that the relationship between the two variables was moderately positive (r = .55-.78, p < .01). Students who were not in attendance were at greater risk for dropping out and other negative behaviors (Kearney, 2008; McConnell & Kubina, 2014). Despite such data, only 88.6% of Missouri students attended school 90% of the time in 2015 (Missouri Department of Elementary and Secondary Education, 2015). In Missouri, a school year was considered 180 days. Thus, a student who attended school 90% of the time, missed approximately 18 days of instruction; if such a pattern were present over a K-12 educational career, it amounted to 234 days of instruction lost. The accumulated 234 days of absences meant that a student who attended class 90% of the time would have graduated 1.3 academic years behind where he or she should be. While research showing that students had such patterns of attendance was not available, researchers reported that students who were routinely absent early in elementary school tended to be chronically absent throughout their K-12 education (Sculles, 2013; Alpers, 2014; Tafelski, 2016; Duardo, 2013). The unacceptable nature of students leaving high school essentially midway through their junior year caused Missouri to include attendance rate in a district's APR calculation. Schoenberger (2012) stated that "ultimately, students not present for instruction are destined to underperform, experience anxiety stemming from their perceived lack of ability, and may eventually decide to drop out of school" (p. 8).

Schoenberger further reported that poor attendance was highly predictive of another APR subset score: graduation rate.

Graduation rate. Based on the extant research, the importance of high school graduation was clear. Students who dropped out of school prior to graduation faced a number of negative effects. Researchers reported lower annual incomes and a greater likelihood of chronic health problems in those individuals who dropped out prior to graduation (Kena et al., 2016; Pleis, Ward, & Lucas, 2010). Other researchers reported that the unemployment rate and incarceration rates were higher among dropouts (Stark & Noel, 2015). Other direr consequences of dropping out included significantly lower lifetime earnings power as well as a much lower life expectancy (Martin & Halpern, 2006). In part, because of NCLB's increased focus on graduation rates, the national graduation rate rose from 71.1% in 2001 (Adams & Sparks, 2013) to 82% for the class of 2014 (U.S. graduation rate, 2016). The statistics for Missouri were even more promising, with 87.4% of students having graduated high school within four years (Missouri Department of Elementary and Secondary Education, 2015). However, the increase was still below the state's target of 92%; thus, Missouri included it as a priority when calculating APR.

APR Total Calculation

Overall APR scores were exceptionally important to Missouri school districts. The scores were published by the state and were reported by major media outlets. As a result, the scores were used to compare and contrast districts to one another. Additionally, the state used APR scores to accredit school districts. A district's overall APR score was the result of five subset scores: academic achievement, subgroup

achievement, college and career readiness, attendance rate, and graduation rate. Totals from each of the categories were added together to give a total score out of 140 possible points. Those districts which did not have qualifying super subgroups could score a maximum of 138 points.

Impact of the Superintendent on Student Achievement

Cudeiro-Nelson (2002) performed a case study analysis of three urban superintendents over four years. The research focused on how each superintendent influenced the capacity for his or her principals' instructional leadership. The first superintendent described four actions which promoted a principal's instructional capacity: a student-centered district vision, standards for student achievement, linking student achievement and evaluation, and merit pay for principals based on student achievement (p. 26). The principals described the superintendent as strongly promoting and supporting principals, but was weak in helping them develop their instructional leadership skills. However, the principals each stated that the superintendent focused primarily on student achievement. Thus, they suggested that the superintendent promoted a climate of high achievement.

The second superintendent in the study by Cudeiro-Nelson also focused on the promotion, development, and support of principals as essential to district success. According to the principals, the superintendent helped to promote instructional leadership by setting clear expectations that the primary focus of the building principal was not one of management, but was one of instructional leadership. The principals reported that the superintendent promoted the development of principals by implementing a professional development that focused on student achievement in math and literacy. Finally, the

principals reported that the superintendent supported principals in two ways. The first way the superintendent promoted an instructional climate was by implementing a servant leadership model at the central office level. The second way the superintendent promoted an instructional climate was by visiting individual buildings to conduct walkthroughs, including discussions on classroom instruction. Again, Cudeiro-Nelson founds that the second superintendent also promoted a climate of high achievement.

The third and final superintendent in the Cudeiro-Nelson study also found that the success of the district was impacted by the superintendent's promotion, development, and support of building principals. The principals reported that the superintendent promoted their principalship by setting high expectations and accountability. The superintendent developed her principals by implementing professional development on improving the classroom walkthrough process. However, the principals reported that the superintendent was not as successful in supporting her principals. Despite the strong supportive atmosphere, the principals again pointed to the promotion of high expectations for achievement as essential to the success of the district.

Overall, the findings of Cudiero-Nelson echoed other research that suggested superintendents had a positive impact on student achievement. Most of the other research found that superintendents impacted achievement by promoting a climate of student achievement, high expectations, and a focus on instruction. For example, Hoegh (2008) suggested that ensuring collaboration among leadership teams also increased student achievement. Other researchers (Arakelyan, 2012; O'Malley, 2011; Rammer, 2007; Waters, Marzano, & McNulty, 2004) added that the hiring and development of effective

building principals also contributed to achievement, a sentiment echoed by multiple researchers.

Two major meta-analyses from the Mid-continent Research for Education and Learning (McREL) demonstrated that superintendents impact student achievement. The first meta-analysis used 70 studies over a 30-year period to determine that there was a significant correlation ($r = .25$) between leadership and student achievement (Waters, Marzano, & McNulty, 2003). Waters and Marzano (2006) supported these findings in the second meta-analysis from McREL, which used 27 studies over a 35-year period to determine there was a significant correlation ($r = .25$) between leadership and student achievement. Additionally, it was in the 2006 study that Waters and Marzano reported "the 'bonus' finding" (p. 14) of a significant positive relationship ($r = .19$, $p < .05$) between superintendent longevity and student achievement. However, the two studies offered little in the way of practical significance, as they explained only 6.25% and 3.61% of the variance, respectively. Such ambiguity in the extant research necessitated further study of the relationship between superintendent longevity and student achievement.

Summary and Conclusion

Expectations for district superintendents have evolved over nearly two centuries. With each new set of expectations came the need for superintendents to adapt to such expectations or lose their jobs. Longevity in the position became the outlier rather than the norm. As the era of accountability for student achievement developed in the late 20th Century, the superintendent position became even more tenuous. All students were

expected to perform at high levels, or the superintendent would receive the blame. This was a shift from previous practices.

> In the past, teachers, administrators and superintendents were often assessed by how *they*, not their students, performed. But that is changing rapidly. School districts around the country are refocusing their attention on student data rather than task completion to measure success. They're asking, "Are our students improving?" (Caruso, 2015, p 10)

In Missouri, achievement expectations were quantified in a district's Annual Performance Report. Though researchers had established a correlation between superintendent longevity and student achievement in other states, no such research was found using Missouri data. The current study sought to establish such a relationship.

This chapter contained a review of literature related to the relationship between superintendent longevity and student achievement. The chapter was divided into four main sections. The first section focused on the nature of the superintendent position. It included a historical development of the superintendency and a discussion about the current state of the superintendency. The second section summarized superintendent longevity. It included a discussion of the relationship between superintendent longevity and student achievement. It also included a brief discussion of research related to superintendent longevity in Missouri. The third section described student achievement in Missouri. It included an explanation of the Annual Performance Report (APR) and its five subsets: academic achievement, subgroup achievement, college and career readiness, attendance rate, and graduation rate. The final section included research

related to the superintendent's impact on APR. The review of literature formed the basis for the hypotheses and the methodology, which will be discussed in chapter three.

Chapter Three

Methods

The primary goal of this study was to confirm past findings and explore the relationship between superintendent longevity and student achievement in Missouri. Prior to the present study, there was a lack of research regarding the correlation between superintendent longevity and student achievement in Missouri. This study explored whether or not a relationship existed between superintendent longevity and student achievement in Missouri. The study also included an exploration as to the predictive nature of superintendent longevity on student achievement when longevity was placed in context with additional variables. The methodology used to explore the relationship between the two variables is presented in this chapter. The chapter is organized into six sections: research design, selection of population, measurement, data collection procedures, data analysis and hypothesis testing, and limitations.

Research Design

To establish the relationship between superintendent longevity and student achievement, the researcher used a quantitative research method. The study qualified as nonexperimental because there was "no manipulation of an independent variable and no random assignment to groups by the researcher" (Johnson & Christensen, 2008, p. 43). The study also employed both a descriptive and correlational research design. The fact that the study established the average longevity of Missouri superintendents qualified it as descriptive, as descriptive studies "describe what is going on or what exists" (Trochim, 2001, p.5). Additionally, the study was correlational, as it measured the relationship between two quantitative variables (Lunenburg & Irby, 2008). Two variables were used

to establish the relationship. The independent variable was superintendent longevity. The primary dependent variable was student achievement, as measured by Annual Performance Report (APR) scores for school districts. Five additional relationships were explored, using superintendent longevity as the independent variable and the five APR subsets (academic achievement, subgroup achievement, college and career readiness, attendance rate, and graduation rate) as the dependent variables. To place the impact of student achievement in context, achievement was included in a multiple regression analysis with three other independent variables (district size, free and reduced lunch percentage, and total district service) to predict the dependent variable (student achievement). Correlations between superintendent longevity and the three additional predictor variables were also established. For a complete description of all the variables included in the study, the reader may refer to Table 1 in chapter one of the present study.

Selection of Participants

In 2014-2015 there were 520 superintendents in the state of Missouri. However, the researcher limited the number of superintendents included in the study by using nonrandom purposive sampling. Johnson and Christensen (2008) suggested using this method when all members of the population who fit specific criteria (established by the researcher) were included in a study. The first criterion was that all participants were K-12 superintendents in the state of Missouri during the 2014-2015 school year. Because some of the districts were only K-8 districts, this criterion reduced the number of potential subjects to 449. The second criterion was that all participants had served at least five consecutive years in their current position at the end of the 2014-2015 school year. This criterion further reduced the number of possible subjects to 193. The final

criterion was that the number of total years each superintendent had served in his or her position could be ascertained by the researcher. This criterion further reduced the sample by six subjects. Thus, the three criteria produced a total of 187 superintendents (36.0% of the population) whom the researcher included in the sample. Descriptive statistics about the sample can be found in chapter four of the current study.

Measurement

For this study, a district's APR was used as the measurement of student achievement. Additionally, APR was subdivided into five categories: academic achievement, subgroup achievement, college and career readiness, attendance rate, and graduation rate. Every public school district in the state was required to submit APR data on an annual basis. The state maintained and published such information, generally in August. Thus, data from the 2014-2015 school year were available in August, 2015. Because the data were archival government data, reliability and validity was assumed.

Superintendent Longevity

The researcher defined superintendent longevity as the number of years an individual served a specific district as that district's chief administrator. Its measurement was simply the total number of years that individual had served his or her current district as superintendent. The population included in the study was limited to those superintendents who had served five or more years at the end of the 2014-2015 school year. Limiting the population to five or more years followed the recommendation of researchers who suggested that the superintendent had to be in his or her position for a minimum of 4-5 years for meaningful and long-lasting change to take place in a district (Fullan, 2007).

Annual Performance Report

A district's Annual Performance Report (APR) was the state's accountability measurement for student achievement. The overall APR score was made up of scores from five subset indicators: academic achievement, subgroup achievement, college and career readiness, attendance rate, and graduation rate. Districts earned points for each APR indicator based on performance. The state placed a premium on certain standards by not weighting each indicator within a standard equally (Missouri Department of Elementary and Secondary Education, 2012, p. 4). While a summary of each subset is included below, a more detailed calculation method is included in Appendix C of the current study.

Academic achievement. The academic achievement standard revolved around students' performance on Missouri Assessment Program (MAP) tests. Students were required to take either a grade-level MAP test or an end-of-course (EOC) exam at various grade levels in four subjects: English Language Arts (ELA), Mathematics, Science, and Social Studies. For each test, students were given a score based on their individual performance on that test. A point value was attached to each of the achievement level scores: below basic (awarded 1 point), basic (awarded 3 points), proficient (awarded 4 points), or advanced (awarded 5 points).

Subgroup achievement. The state recognized five subgroups that traditionally performed below average on standardized assessments: Black/African-American, Hispanic, English language learners (ELL), students with an Individualized Education Program (IEP), and students receiving free or reduced lunch prices (FRL). The state deemed these five "super subgroups." These five super subgroups formed the basis for a

district's accountability under MSIP5. However, a district had to average 30 or more students in a given super subgroup to include that subgroup in the district's APR. Additionally, a student who belonged to multiple subgroups (e. g., IEP and FRL) was only counted once.

College and career readiness. The state created three College and Career Readiness (CCR) measurements with a total of six separate indicators embedded in them. CCR indicators 1-3 (CCR*1-3) revolved around students' performance on four standardized tests: ACT, SAT, COMPASS, and Armed Services Vocational Aptitude Battery (ASVAB). CCR indicator 4 (CCR*4) revolved around students' performance in five post-secondary preparation programs: Advanced Placement (AP) exams, International Baccalaureate (IB) exams, Industry Recognized Credential (IRC) exams, Project Lead the Way (PLTW) exams, and dual credit/dual enrollment. CCR indicator 5-6 (CCR*5-6) revolved around students' post-secondary activities. Any graduate who enlisted in the military, received post-secondary education/training, or was working within 180 days of graduation was counted toward CCR*5-6. The three CCR indicator categories (1-3, 4, 5-6) were combined to give a total number of APR points for CCR.

Attendance rate. The calculation for attendance rate was based on the number of students who attended school at least 90% of the time. All students meeting the 90% threshold were included in the numerator, and all students (including those not meeting the 90% threshold) were included in the denominator. Dividing the numerator by the denominator resulted in a product that, when multiplied by 100, was that year's attendance rate.

Graduation rate. For APR purposes, the state established an adjusted graduation rate for each cohort year. The four-year adjusted cohort graduation rate was calculated based on the number of students who graduated in four years, including students who transferred in and excluding students who transferred out. In addition to the four-year graduation rate, a similar calculation was made for five-, six-, and seven-year graduation rates. The best of the four possible graduation rates was used to calculate the number of APR points.

APR total calculation. A district's overall APR score was the result of five subset scores: academic achievement, subgroup achievement, college and career readiness, attendance rate, and graduation rate. Totals from each of the category were added together to give a total score out of 140 possible points. A summary of the total possible APR points can be found in Appendix D.

Data Collection Procedures

The researcher sought permission to conduct the study from the Baker University Institutional Review Board (IRB). The researcher submitted an IRB form to the Baker University IRB committee (Appendix A). The IRB committee approved the research request on September 1, 2016 (Appendix B). After permission had been granted to conduct the study, the researcher contacted the Missouri Department of Elementary and Secondary Education to help gather the data on superintendent longevity and APR scores. A Data Request Form requesting superintendent longevity and APR data was completed and submitted online. DESE sent the raw data back to the researcher in an Excel workbook format for purposes of statistical treatment and hypothesis testing. However, the earliest data available were from the 2004-2005 school year. For those

superintendents who were serving in their respective positions prior to 2004-2005, an email was sent to them asking what year they started in their current position to determine their longevity. For those superintendents who did not respond, a phone call was made to their school district's central office asking which year they individual started as superintendent.

Data Analysis and Hypothesis Testing

The researcher copied data from the state's Excel file into JASP, a statistics program available online. Correlations were explored between superintendent longevity and each of the APR subset indicator scores; an additional correlation was explored between superintendent longevity and overall APR scores. Correlations were also established between superintendent longevity and three additional variables: district size, percentage of student receiving free and reduced lunch, and total district service. Finally, all four independent variables (superintendent longevity, district size, percentage of student receiving free and reduced lunch, and total district service) were placed into a multiple regression analysis to find which significantly predicted student achievement. Ten research questions and their associated alternative hypotheses were as follows.

RQ1. To what extent is there a relationship between superintendent longevity and academic achievement (as reported by APR in 2014-2015)?

H1. There is a significant relationship between superintendent longevity (the number of years served as superintendent) and APR academic achievement (as reported using MSIP5 Performance Standard 1 in 2014-2015).

RQ2. To what extent is there a relationship between superintendent longevity and subgroup achievement (as reported by APR in 2014-2015)?

H2. There is a significant relationship between superintendent longevity (the number of years served as superintendent) and APR subgroup achievement (as reported using MSIP5 Performance Standard 2 in 2014-2015).

RQ3. To what extent is there a relationship between superintendent longevity and college and career readiness (as reported by APR in 2014-2015)?

H3. There is a significant relationship between superintendent longevity (the number of years served as superintendent) and APR college and career readiness (as reported using MSIP5 Performance Standard 3 in 2014-2015).

RQ4. To what extent is there a relationship between superintendent longevity and attendance rate (as reported by APR in 2014-2015)?

H4. There is a significant relationship between superintendent longevity (the number of years served as superintendent) and APR attendance rate (as reported using MSIP5 Performance Standard 4 in 2014-2015).

RQ5. To what extent is there a relationship between superintendent longevity and graduation rate (as reported by APR in 2014-2015)?

H5. There is a significant relationship between superintendent longevity (the number of years served as superintendent) and APR graduation rate (as reported using MSIP5 Performance Standard 5 in 2014-2015).

RQ6. To what extent is there a relationship between superintendent longevity and overall APR scores (as reported by APR in 2014-2015)?

H6. There is a significant relationship between superintendent longevity and overall APR scores (as reported using the MSIP 5 APR score in 2014-2015).

RQ7. To what extent is there a relationship between superintendent longevity and district size (as measured by the total number of students enrolled)?

H7. There is a significant relationship between superintendent longevity and district size.

RQ8. To what extent is there a relationship between superintendent longevity and the percentage of students receiving free and reduced lunch (as part of the federal program for impoverished students)?

H8. There is a significant relationship between superintendent longevity and the percentage of students receiving free and reduced lunch.

RQ9. To what extent is there a relationship between superintendent longevity and total district service?

H9. There is a significant relationship between superintendent longevity and total district service (as measured by the total number of years a superintendent was employed in his or her district in any capacity)?

RQ10. What combination, if any, of independent variables (superintendent longevity, district size, free and reduced lunch percentage, and total district service) best predict overall APR scores?

H10. Student achievement (as measured using the MSIP 5 overall APR score in 2014-15) can be significantly predicted by superintendent longevity when combined with additional variables (district size, percentage of students receiving free and reduced lunch, total district service).

A Pearson product moment correlation coefficient, also known as a Pearson *r*, was calculated to explore hypotheses 1-9. The Pearson *r* is "a numerical index that

provides information about the strength and direction of the relationship between two variables" (Johnson & Christensen, 2008, p.44). Because the data were bivariate and interval in nature, the Pearson *r* was the most appropriate statistical tool (Lunenburg & Irby, 2008). Hypothesis 10 was tested using a separate stepwise multiple regression analysis. The hypothesis test yielded a multiple correlation coefficient (*R*) as well as a coefficient of determination (R^2). The model's regression weights (*B*) were converted into beta weights (β) to standardize scores across constructs. Such a conversion was necessary because the different independent variables (e. g., superintendent longevity, district size, etc.) contain distinctly different scalar units of measurement. The use of β weights allowed these different constructs to be compared. Lunenberg and Irby (2008) addressed this by suggesting that, as greater *B* weights imply a greater magnitude, conversion to β weights allows comparison across variables "irrespective of the predictor variable with which it is associated" (p. 82). Thus, the use of β weights minimized the likelihood that a given variable was more important simply because of how that variable was measured. For all hypothesis testing, the probability of a Type I error (i. e., incorrectly rejecting the null hypothesis) was set at the .05 level.

Limitations

Lunenburg and Irby (2008) stated that a study's limitations were "factors that may have an effect on the interpretation of the findings or on the generalizability of the results" (p. 133). Therefore, the study had the following limitations.

1. The relationship between superintendent longevity and student achievement was explored using only Missouri data. Therefore, the results of this study may have limited generalizability to other states.

2. The data were drawn from the 2014-2015 school year. Student achievement data varied from year to year. Generalizability to other school years was unknown.
3. By their nature, correlational studies do not imply cause-and-effect relationships. Therefore, suggesting that superintendent longevity caused student achievement results would be statistically incorrect.
4. Researchers suggested that other factors in addition to superintendent longevity influenced student achievement (Chen, 2015). Such variables were out of the control of the researcher but may have influenced the data.

Summary

Chapter three contained an overview of the methodology used in the study. Included in the overview was an explanation of the nonexperimental descriptive and correlational research study's design. The population was described as all K-12 superintendents in Missouri during the 2014-2015 school year who had served as superintendent of their districts for at least five consecutive years. The measurement of two variables was described in the chapter. The first variable, superintendent longevity, was given as the independent variable. The second variable, student achievement (measured by APR), was given as the dependent variable. Overall district APR scores were used to measure achievement. Additionally, the five APR subset scores (academic achievement, subgroup achievement, college and career readiness, attendance rate, graduation rate) were used in separate analyses. Data collection and data analysis methods were described in detail. Research Questions and Hypotheses one through nine focused on the relationship between superintendent longevity and student achievement.

Research Question and Hypothesis ten focused on the predictability of student achievement scores using superintendent longevity in context with additional variables (district size, free and reduced lunch percentage, the number of years in district). The study's limitations were also stated. The results of the data analyses are presented in chapter four.

Chapter Four

Results

The purpose of this study was to examine the relationship between superintendent longevity and student achievement in Missouri. In this study, student achievement was measured using Missouri's Annual Performance Report (APR). A relationship was established between superintendent longevity and each of the five APR subset scores: academic achievement, subgroup achievement, college and career readiness, attendance rate, and graduation rate. A multiple regression analysis was performed using superintendent longevity, district size, free and reduced lunch percentage, and total district service to predict overall APR scores. This chapter is a presentation of the study's significant findings. Descriptive statistics and the results of hypothesis tests are included in this chapter.

Descriptive Statistics

The current study's sample included all K-12 Missouri public school superintendents who had served five or more years in their present position by the end of the 2014-2015 school year. Criterion applied to the population resulted in a sample size of 187 individuals. A summary of the sample's descriptive statistics can be found in Table 3.

Table 3

Mean, Standard Deviation, and Standard Error of the Mean for Superintendent Longevity, District Size, Free and Reduced Lunch Percentage, Number of Years in District, and Overall APR scores

Study Variable	*M*	*SD*	*SEM*
Superintendent Longevity	8.50	4.06	0.30
District Size	1849.90	3357.50	245.50
Free and Reduced Lunch Percentage	54.95	17.63	1.29
Number of Years in District	12.64	6.96	0.51
APR Academic Achievement	90.82	11.09	0.81
APR Subgroup Achievement	84.06	12.67	0.93
APR College and Career Readiness	89.86	11.82	0.86
APR Attendance Rate	94.76	9.96	0.73
APR Graduation Rate	99.73	1.99	0.15
Overall APR Scores	92.14	6.81	0.50

Note: (n = 187). Values for Free and Reduced Lunch and APR Scores (including subset scores) are expressed as a percentage.

Hypothesis Testing

Inferential statistics were used to examine the relationship between superintendent longevity and APR scores. This section includes each of the research questions followed by the corresponding alternative hypothesis. Research questions one through five explored the relationship between superintendent longevity and the five APR subset scores: academic achievement, subgroup achievement, college and career readiness, attendance rate, and graduation rate. Research question six explored the relationship

between superintendent longevity and overall APR scores. Research questions seven through nine explored the relationship between superintendent longevity and the three contextual variables (district size, percentage of students receiving free or reduced lunch, and total district service). Research question ten explored the predictive nature of superintendent longevity on overall APR scores when longevity was placed in context with three other variables: district size, free and reduced lunch percentage, and total district service. A summary of hypotheses one though nine can be found in Table 4.

Table 4

Summary of Hypotheses 1-9 Showing Relationships Between Superintendent Longevity and Dependent Variables

Independent Variable	*r*	R^2	*p*	Constant
APR Academic Achievement	.159*	.025	.030	87.128
APR Subgroup Achievement	.162*	.026	.027	79.752
APR College and Career Readiness	.191*	.036	.009	85.129
APR Attendance Rate	.098	.010	.182	94.759
APR Graduation Rate	.007	.000	.927	99.733
Overall APR Scores	.217*	.047	.003	89.077
District Size	-.031	.001	.672	1849.941
Free and Reduced Lunch	-.443*	.196	<.001	54.947
Total District Service	.581*	.338	<.001	4.156

Note: * indicates significant correlation ($p < .05$).

RQ1. To what extent is there a relationship between superintendent longevity and academic achievement?

H1. There is a significant relationship between superintendent longevity (the number of years served as superintendent) and APR academic achievement (as reported using MSIP5 Performance Standard 1 in 2014-2015).

A Pearson product moment correlation coefficient, also known as a Pearson *r*, was calculated for hypothesis one. The Pearson *r* indicated the strength and the direction of the relationship between superintendent longevity and student achievement. Significance for the hypothesis test was set at the .05 level. The correlation coefficient demonstrated that there was a weak significant positive correlation between superintendent longevity and academic achievement ($r[184] = .159$, $p = .030$). The coefficient of determination ($r^2 = .025$) demonstrated that 2.5% of the variance of academic achievement can be explained by the linear relationship between longevity and academic achievement. Cohen (1988) suggested that a coefficient of this size indicated a small correlation of little practical significance. However, because the relationship was statistically significant, the alternate hypothesis was weakly supported. Therefore, hypothesis one was accepted.

RQ2. To what extent is there a relationship between superintendent longevity and subgroup achievement?

H2. There is a significant relationship between superintendent longevity (the number of years served as superintendent) and APR subgroup achievement (as reported using MSIP5 Performance Standard 2 in 2014-2015).

A Pearson product moment correlation coefficient, also known as a Pearson *r*, was calculated for hypothesis two. The Pearson *r* indicated the strength and the direction of the relationship between superintendent longevity and subgroup achievement.

Significance for the hypothesis test was set at the .05 level. The correlation coefficient demonstrated that there was a weak significant positive correlation between superintendent longevity and subgroup achievement (r[184] = .162, p = .027). The coefficient of determination (r^2 = .026) demonstrated that 2.6% of the variance of subgroup achievement can be explained by the linear relationship between longevity and subgroup achievement. Cohen (1988) suggested that a coefficient of this size indicated a small correlation of little practical significance. However, because the relationship was statistically significant, the alternate hypothesis was weakly supported. Therefore, hypothesis two was accepted.

RQ3. To what extent is there a relationship between superintendent longevity and college and career readiness?

H3. There is a significant relationship between superintendent longevity (the number of years served as superintendent) and APR college and career readiness (as reported using MSIP5 Performance Standard 3 in 2014-2015).

A Pearson product moment correlation coefficient, also known as a Pearson *r,* was calculated for hypothesis three. The Pearson *r* indicated the strength and the direction of the relationship between superintendent longevity and college and career readiness. Significance for the hypothesis test was set at the .05 level. The correlation coefficient demonstrated that there was a weak significant positive correlation between superintendent longevity and college and career readiness (r[184] = .191, p = .009). The coefficient of determination (r^2 = .036) demonstrated that 3.6% of the variance of college and career readiness can be explained by the linear relationship between longevity and college and career readiness. Cohen (1988) suggested that a coefficient of this size

indicated a small correlation of little practical significance. However, because the relationship was statistically significant, the alternate hypothesis was weakly supported. Therefore, hypothesis three was accepted.

RQ4. To what extent is there a relationship between superintendent longevity and attendance rate?

H4. There is a significant relationship between superintendent longevity (the number of years served as superintendent) and APR attendance rate (as reported using MSIP5 Performance Standard 4 in 2014-2015).

A Pearson product moment correlation coefficient, also known as a Pearson *r*, was calculated for hypothesis four. The Pearson *r* indicated the strength and the direction of the relationship between superintendent longevity and attendance rate. Significance for the hypothesis test was set at the .05 level. The correlation coefficient demonstrated that there was not a significant correlation between superintendent longevity and attendance rate ($r[184] = .098$, $p = .182$). Because the probability of a Type I error did not pass the .05 threshold, the relationship was not statistically significant. Thus, the alternate hypothesis was not supported. Therefore, hypothesis four was rejected.

RQ5. To what extent is there a relationship between superintendent longevity and graduation rate?

H5. There is a significant relationship between superintendent longevity (the number of years served as superintendent) and APR graduation rate (as reported using MSIP5 Performance Standard 5 in 2014-2015).

A Pearson product moment correlation coefficient, also known as a Pearson *r*, was calculated for hypothesis five. The Pearson *r* indicated the strength and the direction

of the relationship between superintendent longevity and graduation rate. Significance for the hypothesis test was set at the .05 level. The correlation coefficient demonstrated that there was not a significant correlation between superintendent longevity and graduation rate (r[184] = .007, p = .927). Because the probability of a Type I error did not pass the .05 threshold, the relationship was not statistically significant. Thus, the alternate hypothesis was not supported. Therefore, hypothesis five was rejected.

RQ6. To what extent is there a relationship between superintendent longevity and overall APR scores?

H6. There is a significant relationship between superintendent longevity and overall APR scores (as reported using the MSIP 5 APR score in 2014-2015).

A Pearson product moment correlation coefficient, also known as a Pearson *r,* was calculated for hypothesis six. The Pearson *r* indicated the strength and the direction of the relationship between superintendent longevity and overall APR scores. Significance for the hypothesis test was set at the .05 level. The correlation coefficient demonstrated that there was a weak significant positive correlation between superintendent longevity and overall APR scores (r[184] = .217, p = .003). The coefficient of determination (r^2 = .047) demonstrated that 4.7% of the variance of overall APR scores can be explained by the linear relationship between longevity and overall APR scores. Cohen (1988) suggested that a coefficient of this size indicated a small correlation of little practical significance. However, because the relationship was statistically significant, the alternate hypothesis was weakly supported. Therefore, hypothesis six was accepted.

RQ7. To what extent is there a relationship between superintendent longevity and district size (as measured by the total number of students enrolled)?

H7. There is a significant relationship between superintendent longevity and district size.

A Pearson product moment correlation coefficient, also known as a Pearson *r*, was calculated for hypothesis seven. The Pearson *r* indicated the strength and the direction of the relationship between superintendent longevity and district size. Significance for the hypothesis test was set at the .05 level. The correlation coefficient demonstrated that there was not a significant correlation between superintendent longevity and graduation rate ($r[184] = -.031$, $p = .672$). Because the probability of a Type I error did not pass the .05 threshold, the relationship was not statistically significant. Thus, the alternate hypothesis was not supported. Therefore, hypothesis seven was rejected.

RQ8. To what extent is there a relationship between superintendent longevity and the percentage of students receiving free and reduced lunch (as part of the federal program for impoverished students)?

H8. There is a significant relationship between superintendent longevity and the percentage of students receiving free and reduced lunch.

A Pearson product moment correlation coefficient, also known as a Pearson *r*, was calculated for hypothesis eight. The Pearson *r* indicated the strength and the direction of the relationship between superintendent longevity and free and reduced lunch percentage. Significance for the hypothesis test was set at the .05 level. The correlation coefficient demonstrated that there was a moderate significant negative correlation

between superintendent longevity and the percentage of students receiving free and reduced lunch (r[184] = -.443, p < .001). The coefficient of determination (r^2 = .196) demonstrated that 19.6% of the variance of free and reduced lunch percentage can be explained by the linear relationship between longevity and free and reduced lunch. Because the relationship was statistically significant, the alternate hypothesis was supported. Therefore, hypothesis eight was accepted.

RQ9. To what extent is there a relationship between superintendent longevity and total district service?

H9. There is a significant relationship between superintendent longevity and total district service (as measured by the total number of years a superintendent was employed in his or her district in any capacity)?

A Pearson product moment correlation coefficient, also known as a Pearson *r*, was calculated for hypothesis nine. The Pearson *r* indicated the strength and the direction of the relationship between superintendent longevity and total district service. Significance for the hypothesis test was set at the .05 level. The correlation coefficient demonstrated that there was a moderately strong significant correlation between superintendent longevity and total district service (r[184] = .581, p < .001). The coefficient of determination (r^2 = .338) demonstrated that 33.8% of the variance of total district service can be explained by the linear relationship between longevity and total district service. Because the relationship was statistically significant, the alternate hypothesis was supported. Therefore, hypothesis nine was accepted.

RQ10. What combination, if any, of independent variables (superintendent longevity, district size, free and reduced lunch percentage, and total district service) best predict overall APR scores?

H10. Student achievement (as measured by APR scores) can be significantly predicted by superintendent longevity when combined with additional variables (district size, percentage of students receiving free and reduced lunch, total district service).

A multiple regression analysis was used to test hypothesis ten. The hypothesis test yielded a multiple correlation coefficient (R) as well as a coefficient of determination (R^2). The model's regression weights (B) were converted into beta weights (β) to standardize scores across constructs. This was necessary because the different independent variables (e. g., superintendent longevity, district size, etc.) contain distinctly different scalar units of measurement. The use of β weights allows these different constructs to be compared. Based on the F test for the coefficient of determination, statistically significant models were identified, and these models were evaluated to find the best subset of the independent variables (superintendent longevity, district size, free and reduced lunch percentage, and total district service) for predicting the dependent variable (overall APR score). Evaluation of each model is a two-step process. First, the models were compared to find the most parsimonious model, which was the model with the largest coefficient of determination (R^2), the smallest standard error of the estimate (*SE B*), and the fewest variables. Second, each of the variables in the selected model was tested for a significant contribution to the model. Each slope coefficient was tested using a t test. For the multiple regression analysis, the probability of a Type I error was set at the .05 level.

Prior to performing the multiple regression analysis, two steps were taken to ensure the best possible model. The first step in multiple regression involved assuring that the variables in the model shared as little correlation with one another as possible. Heidgerken (1999) suggested this was necessary since "high correlations between predictor variables can lead to reductions in betas because only one variable is allowed credit for the overlapping variance between correlated predictors" (p. 4). The strongest correlation was $r = .581$, which indicated a moderate relationship between superintendent longevity and total district service. This was to be expected, as each variable accounted for the length of time the individual was in the district. However, none of the variables in the present study had correlations greater than .80. Thus, the four variables were viewed as independent factors. The model's collinearity information is presented in Table 5.

Table 5

Collinearity Between Superintendent Longevity, District Size, Free and Reduced Lunch Percentage, and Total District Service

Independent Variable	Superintendent Longevity	District Size	Free and Reduced Lunch Percentage	Total District Service
Superintendent Longevity	1.00	.059	-.021	.581***
District Size		1.00	-.178*	.027
Free and Reduced Lunch Percentage			1.00	-.043
Number of Years Working in District				1.00

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

The second step in ensuring that the variables were not intercorrelated involved establishing the tolerance level and variance inflation factors (VIF). O'Brien (2007) described tolerance and VIF as "comparing the effects of the proportion of variance a particular independent variable shares with the other independent variables to the situation in which it shares none of its variance with the other independent variables" (p. 676). Tolerance and VIF for all four independent variables are presented in Table 6.

Table 6

Tolerance and Variable Inflation Factors for Superintendent Longevity, District Size, Free and Reduced Lunch Percentage, and Total District Service

Independent Variable	Tolerance	Variable Inflation Factors
Superintendent Longevity	.660	1.515
District Size	.965	1.036
Free and Reduced Lunch Percentage	.967	1.034
Number of Years Working in District	.661	1.513

Menard (1995) stated that "a tolerance of less than 0.20 is cause for concern" (p. 66). Because no tolerance level fell below .20, the factors did not appear to indicate serious intercollinearity. Hair, Black, Babin, Anderson, and Tatham (2006) stated that a VIF that was greater than 10 showed considerable intercollinearity. Because all four VIFs in the present study were well below 10, any intercollinearity between the four factors was negligible and did not impact the results.

Once the intercollinearity of the variables was established, a stepwise multiple regression analysis was performed. The regression analysis was conducted to evaluate the extent to which the overall APR score of a district could be predicted by a

combination of four independent variables: superintendent longevity, district size, free and reduced lunch percentage, and total district service. For the analysis, all four variables were placed into the regression to determine their significance in predicting overall APR scores. The most parsimonious model demonstrated that two variables significantly predicted overall APR scores: free and reduced lunch percentage and superintendent longevity. The result of the regression (R^2 = .238) indicated that the two predictors explained 23.8% of the variance, $F(2, 184) = 28.77$, $p < .0001$. The individual contribution of each variable to the model is included in Table 7.

Table 7

Regression Analysis Summary for Variables Predicting District's Overall APR Scores

Variable	*B*	*SE B*	95% CI	β	*t*	*p*
Free and Reduced Lunch	-.169	.025	[-.218, -.120]	-.438	-6.81	<.0001
Superintendent Longevity	.345	.108	[.132, .558]	.206	3.20	.0016

Note: R^2 = .238 (N = 187, $p < .001$).

Regression stopped at model number two, as only two variables were found to be significant predictors of overall APR scores: superintendent longevity and free and reduced lunch. To test model two, a regression equation was constructed. Based on the regression model, a district's APR score was equal to 98.512 + (- .169 x [Free and Reduced Lunch] + .345 x [Superintendent Longevity]) +/- 5.975. Thus, if a district's free and reduced lunch percentage was held constant, the district's overall APR scores increased by .345% (+/- 5.975%) for each year a superintendent remained in his or her position. In other words, for every increase of one percent of free and reduced lunch, APR will decrease .169%. Additionally, APR will increase .345% for every increase of

one year of longevity. The regression equation established an association between superintendent longevity and APR scores. However, the association was weak and the impact was small. Once the regression equation was established, the researcher applied the equation to predict an outcome. For example, a district whose superintendent remained in his or her position for eight years would have an APR score 1.035% greater than a district who had the same superintendent for only five years. This study established that while an indicator of student achievement, longevity should not be considered a reliable variable in meeting state APR growth criteria. However, because the two variables produced a regression model that significantly predicted overall APR scores, the alternate hypothesis was supported. Therefore, hypothesis ten was accepted.

Additional Analysis

After a review of the data set, exploratory analysis was performed on the study's variables. The two variables in the current study, district size and total district service, were not found to be significant predictors of overall APR score at the .05 level. However, it should be noted that while district size was not included in the regression model above, its significance level was just outside of the established .05 level (p = .0549). A change in the parameters of the present study to include a .10 probability of a Type I error would have allowed district size to remain as a significant predictor of student achievement ($\beta = -.126$), while still allowing for a highly significant regression model, $F(3, 183) = 20.71$, $p < .0001$. This inclusion of the third variable would have resulted in an increase to the coefficient of determination ($R^2 = .254$) and greater explanation of the variance (25.4%), albeit with a lower threshold for a Type I error.

Summary

This chapter contained the results of the study's hypothesis testing. The ten hypotheses addressed the ten research questions. Correlations were explored between superintendent longevity, district size, free and reduced lunch percentage, total district service, and APR scores. Six significant relationships were computed: longevity and APR academic achievement; longevity and APR subgroup achievement; longevity and college and career readiness; longevity and overall APR scores; longevity and free and reduced lunch percentage; and longevity and total district service. A multiple regression analysis was performed, using superintendent longevity, district size, free and reduced lunch percentage, and total district service to predict overall APR scores. The results of the multiple regression model were presented. Based on the β weights in the model, the percentage of students on free and reduced lunch prices was the primary predictor of overall APR scores. Superintendent longevity was the second greatest predictor of overall APR scores in the model. No other variables significantly predicted APR scores. A further interpretation of the results can be found in chapter five.

Chapter Five

Interpretation and Recommendations

This chapter contains a summary and interpretation of the data presented in the previous chapter. Included is an overview of the problem, purpose statements, research questions, and methodology. Major findings are summarized, and the findings are compared and contrasted to the findings reported in the extant literature. Additionally, implications for action and recommendations for future research are included. Finally, the chapter finishes with concluding remarks about the study.

Study Summary

The current study was performed to explore the relationship between superintendent longevity and student achievement (measured by a district's 2014-2015 APR scores). The study focused on Missouri K-12 superintendents with five or more years as superintendent in the same district. The results of the study weakly supported the hypothesis that a relationship existed between longevity and achievement.

Overview of the problem. Pressure for student achievement was a driving force for change in school districts. The public demanded districts perform at high levels (Jacobsen & Wilder, 2007). As district leaders, superintendents were being held accountable for student achievement. Low achievement rates often led to reduced longevity for superintendents (Clark, 2001). Reid (2001) demonstrated that a consequence of the superintendent's departure was often a further reduction in student achievement. Thus, student achievement could have been impacted negatively by a lack of superintendent longevity.

Purpose statement and research questions. Before the present study, there was limited research that explored the relationship between superintendent longevity and the preeminent measurement of student achievement in the state of Missouri, district APR. The first purpose of the study was to explore the relationship between superintendent longevity and overall APR scores. Because overall APR scores were comprised of five subset scores, the second purpose was to explore the relationship between superintendent longevity and the five individual subset scores. The third purpose was to confirm or contrast the findings of other researchers: that superintendent longevity can be included with other variables to predict student achievement. For the current study, longevity was placed in context with district size, free and reduced lunch percentage, and total district service to predict overall APR scores. Ten research questions were explored.

RQ1. To what extent is there a relationship between superintendent longevity and academic achievement (as reported by APR in 2014-2015)?

RQ2. To what extent is there a relationship between superintendent longevity and subgroup achievement (as reported by APR in 2014-2015)?

RQ3. To what extent is there a relationship between superintendent longevity and college and career readiness (as reported by APR in 2014-2015)?

RQ4. To what extent is there a relationship between superintendent longevity and attendance rate (as reported by APR in 2014-2015)?

RQ5. To what extent is there a relationship between superintendent longevity and graduation rate (as reported by APR in 2014-2015)?

RQ6. To what extent is there a relationship between superintendent longevity and overall APR scores (as reported by APR in 2014-2015)?

RQ7. To what extent is there a relationship between superintendent longevity and district size (as measured by the total number of students enrolled)?

RQ8. To what extent is there a relationship between superintendent longevity and percentage of students receiving free and reduced lunch (as part of the federal program for impoverished students)?

RQ9. To what extent is there a relationship between superintendent longevity and total district service (as measured by the total number of years a superintendent was employed in his or her district in any capacity)?

RQ10. What combination, if any, of independent variables (superintendent longevity, district size, free and reduced lunch percentage, and total district service) best predict overall APR scores?

Each of the ten research questions addressed one of the study's three purposes. The reader may refer to Table 1 for a further summary of the questions and corresponding purposes.

Review of the methodology. This study used a quantitative nonexperimental correlational research design. The sample included all individuals with five or more years of experience as superintendent in a Missouri K-12 school district in 2014-2015. Pearson product moment correlations were used to establish relationships between superintendent longevity and overall APR scores, as well as longevity and APR subset scores (academic achievement, subgroup achievement, college and career readiness, graduation rate, and attendance rate). Separate correlations were established between superintendent longevity and each of the three contextual variables (district size, free and reduced lunch percentage, and total district service). A multiple regression analysis was

performed to explore the predictive value of four independent variables (superintendent longevity, district size, free and reduced lunch percentage, and total district service) on the dependent variable (overall APR scores). For all hypotheses, the probability of a Type I error was set at the .05 level.

Major findings. The three purposes of the study were addressed in the major findings. The findings related to the first purpose indicated that there was a statistically significant positive relationship between superintendent longevity and overall APR scores. However, the relationship between the two variables was found to be very weak and offered little practical significance. Thus, superintendent longevity did not have much of an impact on overall APR scores. The findings related to the second purpose indicated that there was a statistically significant relationship between superintendent longevity and three of the APR subsets (academic achievement, subgroup achievement, and college and career readiness). However, these relationships were also found to be very weak, also offering little practical significance. Thus, superintendent longevity did not have much of an impact on APR subset scores. Finally, multiple regression analysis found that a combination of two variables (free and reduced lunch percentage and superintendent longevity) significantly predicted overall APR scores. District size was found to be just above the level of significance set in the study's parameters ($p = .0549$); thus it was not included in the final regression model.

Findings Related to the Literature

This section examines the findings of the current study in the context of those found in the related literature. Specifically, the section contains a review of how the current study confirmed or refuted the findings of prior research. This section will

demonstrate that many of the current study's findings supported those of the related literature, while other findings were contradictory to previous research. The section will focus primarily on how the findings support or refute the literature related to the ten research questions.

Research regarding the relationship of superintendent longevity to APR scores was not available in the related literature. Specifically, no literature which included APR subset scores was available. However, because APR scores were measurements of student achievement, all individual subset scores were viewed as part of a singular construct: student achievement. The relationship between superintendent longevity and student achievement was well-established. The findings of the current study closely mirrored those of many previous researchers who found significant statistical correlations between longevity and achievement (Waters & Marzano, 2006; Libka, 2012; Metcalfe, 2007; Sorgi, 2006; Waters, Marzano, & McNulty, 2003). However, as the previous researchers reported, the correlations found were weak and offered little practical significance.

The findings in the current study also supported prior research regarding the relationship between superintendent longevity and the three additional contextual variables. Some researchers reported significant correlations between superintendent longevity and district size (Jacobs, 2009; Myers, 2010), as well as correlations between longevity and free and reduced lunch percentage (Natkin, Cooper, Alborano, Padilla, and Ghosh, 2003; Myers, 2010). However, others reported no significant relationships between longevity and district size (Natkin, Cooper, Alborano, Padilla, and Ghosh, 2002; Libka, 2012), as well as between longevity and free and reduced lunch percentage

(Metcalfe, 2007; Quinn, 2005). Prior to the current study, researchers had not explored the relationship of superintendent longevity to the study's third contextual variable, total district service.

The final research question revolved around the predictive nature of the four independent variables (superintendent longevity, district size, free and reduced lunch percentage, and total district service) on the dependent variable, overall APR score. No previous research had used APR scores to measure student achievement; however, other studies had established the predictive nature of the variables on other measures of student achievement. The findings of the current study confirmed findings of Myers (2010). Similar to the current study, Myers found that superintendent longevity and free and reduced lunch percentage both significantly predicted achievement. The findings of the current study also refuted those of Myers. Myers reported that the greatest predictor of achievement was district size, the current study found that district size was insignificant. However, in the current study's additional analysis, the researcher reported that the significance value was only slightly above the .05 threshold.

Some of the findings in the current study contrasted those of Plotts (2011), who reported that superintendent longevity did not significantly predict student achievement. However, as in the current study, Plotts reported that greater levels of poverty (as indicated by the percentage of students receiving free lunch) were also a significant predictor. Plotts found that district size was not a significant predictor of achievement. Thus, the current study confirmed the findings of Plotts that poverty predicted student achievement. The current study also confirmed that district size did not predict

achievement. However, the study refuted Plotts by finding that longevity predicted achievement.

The multiple regression equation that the researcher established as a result of testing hypothesis ten also confirmed the findings of previous research (Fullan, 2007). Fullan reported that a superintendent needed at least eight years in a district to impart change. The regression equation summarized in chapter four of the current study was applied to an imaginary example. In the example, a district whose superintendent remained in his or her position for eight years would have an APR score 1.035% greater than a district who had the same superintendent for the 5.5-year average reported by Vogt (2007). Thus, the finding by Fullan that longevity impacts student achievement was supported by the current study.

Conclusions

This section contains conclusions derived from the current study's exploration of the relationship between superintendent longevity and student achievement. The findings of this study may be of interest to superintendents and school boards in Missouri. This section contains implications for action, recommendations for future research, and concluding remarks about the study.

Implications for action. The primary focus of the study was the relationship between superintendent longevity and student achievement. While the findings of the current study indicated that longevity and achievement shared some variability, the correlations were weak and did not offer any practical significance. However, research indicated that districts who had longer term superintendents tended to outperform districts whose superintendent stays were shorter (Libka, 2012; Simpson, 2013). It is

important for districts to create barometers for success that extend beyond APR scores, as every district is unique and has its own set of challenges. Districts should attend to APR scores, but they should also develop scoring guides that are tailored to their individual needs. Districts could then review their own data points to pinpoint specific problems on which the board and superintendent could work together.

An additional implication dealt with the needs of high-poverty districts. Because of the unique needs of high-poverty districts, stable environments are necessary to success (O'Day & Smith, 2016). The regression equation in the current study indicated that, when district poverty levels (as measured by free and reduced lunch percentage) are kept at a mathematical constant, greater levels of superintendent longevity predicted higher student achievement scores.

Recommendations for future research. This study was conducted to determine the relationship between superintendent longevity and district APR scores. Three additional contextual variables (district size, free and reduced lunch percentage, and total district service) were combined with longevity to attempt to predict APR scores. Future research should continue to build on the findings of the current study.

The first recommendation is to use additional contextual variables to predict student achievement. By including additional variables, further variance should be explained. For example, the inclusion of the gender of the superintendent, geographic area (urban, suburban, or rural), staff-to-student ratio, assessed valuation, average principal longevity, and average teacher longevity could improve on the current study's regression model.

The second recommendation is to conduct a longitudinal study of the relationship between superintendent longevity and student achievement. The current study was based on data from the 2014-2015 school year. With no comparison data, it was unclear whether the data collected were an anomaly or indicative of a long-term issue. A longitudinal study would show whether a relationship between longevity and achievement existed over time.

The third recommendation is to conduct further studies similar to the current one in specific geographical regions. The studies are needed to explore whether or not the relationship between superintendent longevity and student achievement in rural districts is comparable to that of urban districts. These studies could lead to even further research that allowed for a comparison between urban, suburban, and rural areas.

Concluding remarks. Missouri school districts continue to struggle with student achievement. MSIP5 included major changes on how achievement was measured. However, APR was still an essential part of how districts, the state, and the general public judged public schools. The findings of this study established that while an indicator of student achievement, longevity should not be considered a reliable variable in meeting state APR growth criteria.

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Appendices

Appendix A: IRB Request

School of education
Graduate department

Date:
IRB PROTOCOL NUMBER _____
(irb USE ONLY)

IRB Request
Proposal for Research
Submitted to the Baker University Institutional Review Board

I. Research Investigator(s) (Students must list faculty sponsor first)

Department(s) **School of Education Graduate Department**

	Name	Signature
1.	James Robins	_____, Major Advisor
2.	Phil Messner	_____, Research Analyst
3.	Harold Frye	University Committee Member
4.	Jennifer Price	External Committee Member

Principal Investigator: Brian Rudolph
Phone: [redacted]
Email: [redacted]
Mailing address: [redacted]

Faculty sponsor: James Robins
Phone: [redacted]
Email: [redacted]

Expected Category of Review: _X_Exempt __ Expedited _ __Full

II: Protocol: (Type the title of your study)

The relationship between superintendent longevity and student achievement in Missouri

Summary

In a sentence or two, please describe the background and purpose of the research.

The researcher will explore the relationship between superintendent longevity and Annual Performance Report (APR) scores in Missouri. Additionally, the researcher will

establish the predictive nature of student achievement scores using four independent variables: superintendent longevity, district size, percentage of students receiving free and reduced lunch, and total district service.

Briefly describe each condition or manipulation to be included within the study.

No manipulation of the subjects will be included in the study. Only public information archival data will be used for the study. However, the following variables will be studied: the number of years a superintendent has been in his or her position, the total district size, the number of students on free and reduced lunch prices, the total number of years a superintendent has been employed in a district in any capacity, and a school district's Annual Performance Report (APR).

What measures or observations will be taken in the study? If any questionnaire or other instruments are used, provide a brief description and attach a copy.

No measures, observations, or other instruments will be used in the study. Only public information archival data will be used for the study.

Will the subjects encounter the risk of psychological, social, physical, or legal risk? If so, please describe the nature of the risk and any measures designed to mitigate that risk.

No subjects will encounter psychological, social, physical or legal risk. Only public information archival data will be used for the study.

Will any stress to subjects be involved? If so, please describe.

No stress to the subjects will be involved. Only public information archival data will be used for the study.

Will the subjects be deceived or misled in any way? If so, include an outline or script of the debriefing.

No subjects will be deceived or misled in any way. Only public information archival data will be used for the study.

Will there be a request for information which subjects might consider to be personal or sensitive? If so, please include a description.

No subjects will be asked for information which might be considered personal or sensitive. Only public information archival data will be used for the study.

Will the subjects be presented with materials which might be considered to be offensive, threatening, or degrading? If so, please describe.

No subjects be presented with materials which might be considered to be offensive, threatening, or degrading. Only public information archival data will be used for the study.

Approximately how much time will be demanded of each subject?

No time will be requested of any subject. Only public information archival data will be used for the study**.**

Who will be the subjects in this study? How will they be solicited or contacted? Provide an outline or script of the information which will be provided to subjects prior to their volunteering to participate. Include a copy of any written solicitation as well as an outline of any oral solicitation.

The population of the study includes all district superintendents who had served five or more years in the same district at the end of the 2014-15 school year.

What steps will be taken to insure that each subject's participation is voluntary? What if any inducements will be offered to the subjects for their participation?

No participation request will be sought nor will any inducement be given. Only public information archival data will be used for the study.

How will you insure that the subjects give their consent prior to participating? Will a written consent form be used? If so, include the form. If not, explain why not.

Written informed consent is not required, as only public information archival data will be used for the study. However, no individual superintendent or school district will be identified by name in the study.

Will any aspect of the data be made a part of any permanent record that can be identified with the subject? If so, please explain the necessity.

No aspect of the data will be made part of any permanent record that can be identified with the subject.

Will the fact that a subject did or did not participate in a specific experiment or study be made part of any permanent record available to a supervisor, teacher or employer? If so, explain.

No, the fact that a subject did or did not participate in a specific experiment or study will not be made part of any permanent record available to a supervisor, teacher, or employer.

What steps will be taken to insure the confidentiality of the data? Where will it be stored? How long will it be stored? What will be done with it after the study is completed?

All data are publicly available archival data, maintained by the Missouri

Department of Elementary and Secondary Education (DESE). The data provided to the researcher by the state will be kept electronically by the researcher for an indefinite amount of time.

If there are any risks involved in the study, are there any offsetting benefits that might accrue to either the subjects or society?

There are no risks to any individual involved in the study.

Will any data from files or archival data be used? If so, please describe.

Yes. Data for all variables used in the study are archival and will be procured from the Missouri Department of Elementary and Secondary Education.

Appendix B: IRB Approval Letter

BAKER UNIVERSITY
1858 Own Confidence

Baker University Institutional Review Board

September 1, 2016

Dear Brian Rudolph and Dr. Robins,

The Baker University IRB has reviewed your research project application and approved this project under Exempt Status Review. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, approval lapses one year after approval date.

Please be aware of the following:

1. Any significant change in the research protocol as described should be reviewed by this Committee prior to altering the project.
2. Notify the IRB about any new investigators not named in original application.
3. When signed consent documents are required, the primary investigator must retain the signed consent documents of the research activity.
4. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.
5. If the results of the research are used to prepare papers for publication or oral presentation at professional conferences, manuscripts or abstracts are requested for IRB as part of the project record.

Please inform this Committee or myself when this project is terminated or completed. As noted above, you must also provide IRB with an annual status report and receive approval for maintaining your status. If you have any questions, please contact me at emorris@BakerU.edu or 785.594.7881.

Sincerely,

Erin R, Morris PhD
Chair, Baker University IRB

Baker University IRB Committee
Susan Rogers PhD
Nate Poell MA
Joe Watson PhD
Scott Crenshaw

Appendix C: Summary of APR Calculations

The following is a summary of calculation method for APR scores (including APR subset scores).

Academic achievement. The district was assigned a MAP Performance Index (MPI) to measure overall student achievement. "The MPI is a single composite number that represents the MAP assessment performance of every student by awarding points to each student based on the four achievement levels" (Missouri Department of Elementary and Secondary Education, 2015, p. 18). For a district's MPI in a given subject area, the sum of all students' achievement level points was divided by the number of students in that subject's group, with the product multiplied by 100. Total MPI scores were then categorized based on one of four status measures: 2020 target (the goal of Missouri to have one of the top 10 educational systems in the United States by the year 2020), On Track, Approaching, or Floor. Total APR points were then awarded based on where the district's status measure fell (Table 8).

Table 8

Possible APR Status Points by Subject for Academic Achievement

Status	ELA	Math	Science	SS
2020 Target	16	16	16	8
On Track	12	12	12	6
Approaching	9	9	9	5
Floor	0	0	0	0

Note. Adapted from *Comprehensive guide to the Missouri School Program*, (p. 10) by Missouri Department of Elementary and Secondary Education, 2014. Retrieved March 28, 2016, from http://dese.mo.gov/sites/default/files/MSIP-5-comprehensive-guide.pdf

Because the focus of APR was to ensure all students progressed, districts could earn additional APR points by showing improvement over previous years. There were

two routes to the additional points: progress and growth. DESE divided each into four categories: Exceeding, On Track, Approaching, and Floor. Points in the progress category were awarded based on a district's MPI compared to previous years.

1. The state awarded points in the Exceeding category if the district showed at least 5% MPI improvement over an average of the last two years' MPIs.
2. The state awarded points in the On Track category if the district showed 3-5% MPI improvement over an average of the last two years' MPIs.
3. The state awarded points in the Approaching category if the district showed at least 1-3% MPI improvement over an average of the last two years' MPIs.
4. The state awarded no points in the Floor category, which indicated the district MPI grew by less than 1% over an average of the last two years' MPIs.

Progress points dealt directly with MPI. Thus, all four MAP-tested subjects (i. e., ELA, Math, Science, and Social Studies) were eligible to contribute to progress points. Growth points, however, were only awarded in ELA and Math.

Where progress points placed all students into the same tested group, growth points looked at the progress of individual students over two points in time. While the current study does not warrant a full description of the statistical procedure, DESE described the rationale for the measures in their *Comprehensive guide to the Missouri School Program* (2014) document.

> It is important to note that these measures are just one gauge of effectiveness. They are not designed to be a measure of progress toward the state's 2020 performance targets, for example. Instead, they indicate how achievement gains toward similarly circumstanced students in similarly circumstanced LEAs (Local

> Education Agencies) or schools differ as a function of the *particular* LEAs or schools where students were enrolled when they took the MAP exams. In this way, estimates generated by the Missouri Growth Model are relative. (p. 84)

Districts could only earn growth points for ELA and Math MAP assessments in grades 4-8. Districts earning both progress and growth points were only allowed to include the higher of the two point values. The total possible number of points for both progress and growth measures are included in Table 9.

Table 9

Possible Progress and Growth APR Points for Academic Achievement

	Progress				Growth			
Status/Progress	ELA	Math	Science	SS	ELA	Math	Science	SS
Exceeding	12	12	12	6	12	12	n/a	n/a
On Track	6	6	6	3	6	6	n/a	n/a
Approaching	3	3	3	1.5	n/a	n/a	n/a	n/a
Floor	0	0	0	0	0	0	n/a	n/a

Note: Adapted from *Comprehensive guide to the Missouri School Program,* (p. 10) by Missouri Department of Elementary and Secondary Education, 2014. Retrieved March 28, 2016, from http://dese.mo.gov/sites/default/files/MSIP-5-comprehensive-guide.

The total number of progress or growth points were added to the status points to give an overall APR for student achievement.

Subgroup achievement. The overall calculation for the subgroup achievement (using MPI of super subgroup members only) was similar to the calculation for overall academic achievement. The MAP assessment schedule (Table 2) was the same. Districts could earn APR points based on status as well as progress or growth. However, the

number of points that districts could receive for subgroup achievement was different than they could earn for overall student achievement (Table 10).

Table 10

Possible APR Points for Subgroup Achievement

Status			Progress			Growth	
Status	ELA/ Math/ Science	SS	Progress	ELA/ Math/ Science	SS	Growth	ELA & Math
2020 Target	4	2	Exceeding	3	1.5	Exceeding	3
On Track	3	1.5	On Track	2	1	On Track	2
Approaching	2	1	Approaching	1	.5	Approaching	n/a
Floor	0	0	Floor	0	0	Floor	0

Note: Adapted from *Comprehensive guide to the Missouri School Program,* (p. 21) by Missouri Department of Elementary and Secondary Education, 2014. Retrieved March 28, 2016, from http://dese.mo.gov/sites/default/files/MSIP-5-comprehensive-guide.pdf.

College and career readiness. The state created three College and Career Readiness (CCR) measurements with a total of six separate indicators embedded in them. CCR indicators 1-3 (CCR*1-3) revolved around students' performance on four standardized tests: ACT, SAT, COMPASS, and Armed Services Vocational Aptitude Battery (ASVAB). CCR*1-3 provided points based on how individual students scored on one of the four tests. Weights were given to each student's score based on how he or she performed on the test compared to the state average for that test (Table 11). For example, a student who scored well above the state average of 21.7 on the ACT would be assigned a weight of 1.25 for his or her CCR*1-3 score.

Table 11

Student Weights for College and Career Readiness Indicator 1-3

Weight	ACT Composite	SAT Reading + Math	COMPASS Algebra + Reading	ASVAB
0	No score	No score	No score	No score
.25	<18	<870	Algebra <66, Reading <81	<30
.75	18-21	870-980	Algebra ≥66 or Reading ≥81	30-62
1	22-25	990-1180	Algebra ≥66 and Reading ≥81	63-87
1.25	≥26	≥1190	n/a	≥88

Note: Adapted from *Comprehensive guide to the Missouri School Program*, (p. 82) by Missouri Department of Elementary and Secondary Education, 2014. Retrieved March 28, 2016, from http://dese.mo.gov/sites/default/files/MSIP-5-comprehensive-guide.pdf.

Regardless of how many of the four tests were taken by an individual student, only that student's best score (i. e., highest weight) was included in the calculation. CCR*1-3 points were only assigned to a cohort year and were only applied when that cohort graduated. Thus, only scores for 2015 graduates were included in the current study. Additionally, points were assigned based on progress measures. Progress involved comparing a given year's score to the average of the two previous years. Progress points ensured that districts could recover CCR*1-3 points based on improvement rather than solely on status.

CCR indicator 4 (CCR*4) revolved around students' performance in five post-secondary preparation programs: Advanced Placement (AP) exams, International Baccalaureate (IB) exams, Industry Recognized Credential (IRC) exams, Project Lead the Way (PLTW) exams, and dual credit/dual enrollment. Students who received a qualifying score on an AP, IB, IRC, or PLTW exam or received college credit while in

high school earned CCR*4 points. Weights were given to each student's score based on how he or she performed on the test compared to an established standard (Table 12). For example, a student who received a score of 4 on and AP test would be assigned a weight of 1.25 for his or her CCR*4 score.

Table 12

Student Weights for College and Career Readiness Indicator 4

Weight	AP	IB	PLTW	IRC	Dual Credit
0	No score or grade <B	No score or grade <B	No score or score <6	No score or score < proficient	No score or grade <B
1	Grade ≥B	Grade ≥B	Exam score ≥6	Proficient on IRC exam	Grade ≥B
1.25	Exam score ≥3	Exam score ≥4	n/a	n/a	n/a

Note: Adapted from *Comprehensive guide to the Missouri School Program*, (p. 82) by Missouri Department of Elementary and Secondary Education, 2014. Retrieved March 28, 2016, from http://dese.mo.gov/sites/default/files/MSIP-5-comprehensive-guide.pdf

Regardless of how many of the five exams were taken by an individual student, only that student's best score (i. e., highest weight) was included in the calculation. CCR*4 points were only assigned to a cohort year and were only applied when that cohort graduated. Thus, only scores for 2015 graduates were included in the current study. Additionally, points were assigned based on progress measures. Progress involved comparing a given year's score to the average of the two previous years. Progress points ensured that districts could recover CCR*4 points based on improvement rather than solely on status.

CCR indicator 5-6 (CCR*5-6) revolved around students' post-secondary activities. Any graduate who enlisted in the military, received post-secondary education/training, or was working within 180 days of graduation was counted toward

CCR*5-6. The sum of all such graduates was divided by the total number of graduates for that year. For example, if a total of 300 out of a possible 400 graduates met one of the CCR*5-6 criteria, the district would receive points for 75% of the graduates (300/400=.75). Because districts did not obtain these data until six months after students graduated, CCR*5-6 was considered "a lagged indicator representing graduates from the preceding year(s)" (Missouri Department of Elementary and Secondary Education, 2014, p. 35). The percentage of graduates meeting CCR*5-6 in a given year was combined with that of the previous two years to create a three-year average. This three-year average determined the status points for APR. Additionally, points were assigned based on progress measures. Progress involved comparing a given year's score to the mean of the two previous years. Progress points ensured that districts could recover CCR*5-6 points based on improvement rather than solely on status.

The three CCR indicator categories (1-3, 4, 5-6) were combined to give a total number of APR points for CCR. Additionally, progress points for each category were added to the APR score. However, within each indicator category, the number of APR points received could not exceed the total number of points possible for that category. A summary of the possible CCR point totals can be found in Table 13.

Table 13

Total Possible College and Career Readiness Points by Indicator(s)

Status				Progress			
Status	1-3	4	5-6	Progress	1-3	4	5-6
2020 Target	10	10	10	Exceeding	7.5	7.5	7.5
On Track	7.5	7.5	7.5	On Track	4	4	4
Approaching	6	6	6	Approaching	2	2	2
Floor	0	0	0	Floor	0	0	0

Note: Adapted from *Comprehensive guide to the Missouri School Program*, (p. 25, 30, 35) by Missouri Department of Elementary and Secondary Education, 2014. Retrieved March 28, 2016, from http://dese.mo.gov/sites/default/files/MSIP-5-comprehensive-guide.pdf

Attendance rate. The calculation for attendance rate was based on the number of students who attended school at least 90% of the time. All students meeting the 90% threshold were included in the numerator, and all students (including those not meeting the 90% threshold) were included in the denominator. Dividing the numerator by the denominator resulted in a product that, when multiplied by 100, was that year's attendance rate. The two previous years' attendance rate percentages were added to the current year's rate and divided by three to achieve a three-year status average. Additionally, points were assigned based on progress measures; this meant that districts could recover attendance rate points based on improvement rather than solely on status. Progress involved comparing a given year's attendance rate to the average of the two previous years. Districts received progress points based on three criteria: Exceeding (≥3% growth), On Track (≥2% growth), or Approaching (≥1% growth). Districts with less than 1% growth were given a designation of "Floor" and no progress points were

awarded. For those districts receiving progress points, they were added to the attendance rate APR score. However, the number of APR points received for attendance rate could not exceed the total number of points possible. A summary of the possible attendance rate point totals can be found in Table 14.

Table 14

Total Possible Attendance Rate Points

Status			Progress		
Status	Points	% Students with 90% Attendance	Progress	Points	Increase
2020 Target	10	90.0-100.0	Exceeding	7.5	≥3%
On Track	7.5	85.0-89.9	On Track	4	≥2%
Approaching	6	80.0-84.9	Approaching	2	≥1%
Floor	0	0-79.9	Floor	0	<1%

Note: Adapted from *Comprehensive guide to the Missouri School Program,* (p. 43) by Missouri Department of Elementary and Secondary Education, 2014. Retrieved March 28, 2016, from http://dese.mo.gov/sites/default/files/MSIP-5-comprehensive-guide.pdf

Graduation rate. For APR purposes, the state established an adjusted graduation rate for each cohort year. Four-year adjusted cohort graduation rate was calculated based on the number of students who graduated in four years, including students who transferred in and excluding students who transferred out. In addition to the four-year graduation rate, a similar calculation was made for five-, six-, and seven-year graduation rates. The best of the four possible graduation rates was used to calculate the number of APR points. DESE determined status by calculating the average of the most recent three years of adjusted cohort graduation rate. Additionally, points were assigned based on progress measures; this meant that districts could recover graduation rate points based on

improvement rather than solely on status. Progress involved comparing a given year's graduation rate to the average of the two previous years. Districts received progress points based on their status determination. The closer a district was to a Floor status designation, the greater increase needed for progress points (see Table 15).

Table 15

Progress Point Determination for Graduation Rate

If Status=Floor		If Status=Approaching		If Status=On Track/2020 Target	
2020 Target	9%	2020 Target	6%	2020 Target	3%
On Track	6%	On Track	4%	On Track	2%
Approaching	3%	Approaching	2%	Approaching	1%

Note: Adapted from *Comprehensive guide to the Missouri School Program,* (p. 53) by Missouri Department of Elementary and Secondary Education, 2014. Retrieved March 28, 2016, from http://dese.mo.gov/sites/default/files/MSIP-5-comprehensive-guide.pdf

For those districts receiving progress points, they were added to the attendance rate APR score. However, the number of APR points received for graduation rate could not exceed the total number of points possible. A summary of the possible graduation rate point totals can be found in Table 16.

Table 16

Total Possible Graduation Rate Points

Status			Progress	
Status	Graduation Rate	Points	Progress	Points
2020 Target	92.0-100	30	Exceeding	22.5
On Track	82.0-91.9	22.5	On Track	12
Approaching	72.0-81.9	18	Approaching	6
Floor	0-71.9	0	Floor	0

Note: Adapted from *Comprehensive guide to the Missouri School Program*, (p. 53) by Missouri Department of Elementary and Secondary Education, 2014. Retrieved March 28, 2016, from http://dese.mo.gov/sites/default/files/MSIP-5-comprehensive-guide.pdf

Appendix D: Total APR Calculation Table

Table 17

Total Possible Annual Performance Report Points

APR Subset	Subpoints	Total Subset Points
Academic Achievement		56
English Language Arts	16	
Mathematics	16	
Science	16	
Social Studies	8	
Subgroup Achievement		14
English Language Arts	4	
Mathematics	4	
Science	4	
Social Studies	2	
College and Career Readiness		30
CCR*1-3	10	
CCR*4	10	
CCR*5-6	10	
Attendance Rate		10
Graduation Rate		10

Note: Adapted from *Comprehensive guide to the Missouri School Program,* (p. 53) by Missouri Department of Elementary and Secondary Education, 2014. Retrieved March 28, 2016, from http://dese.mo.gov/sites/default/files/MSIP-5-comprehensive-guide.pdf